HP ProLiant BL35p Server Blade
User Guide

August 2006 (Fourth Edition)
Part Number 379104-004

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Audience assumptions

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

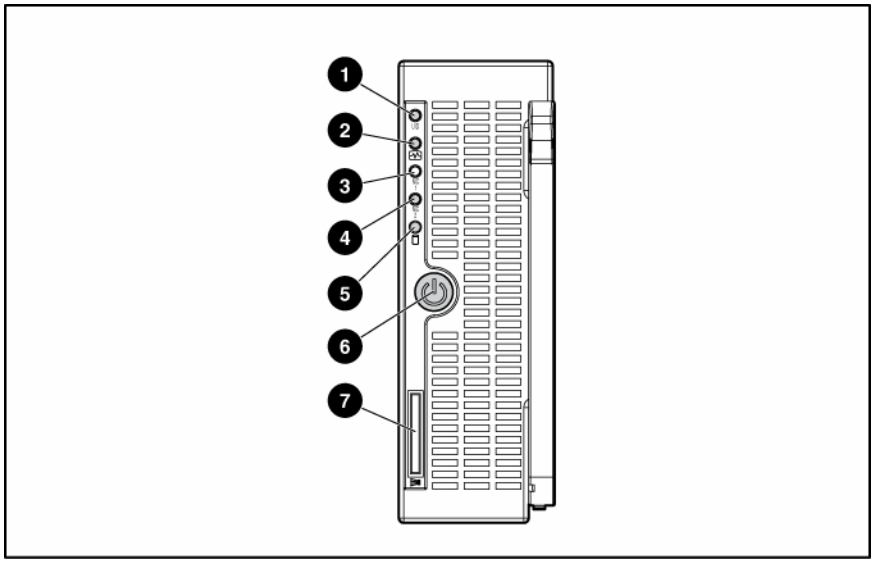
Contents

Component identification

In this section

Server blade components

Front panel components and LEDs

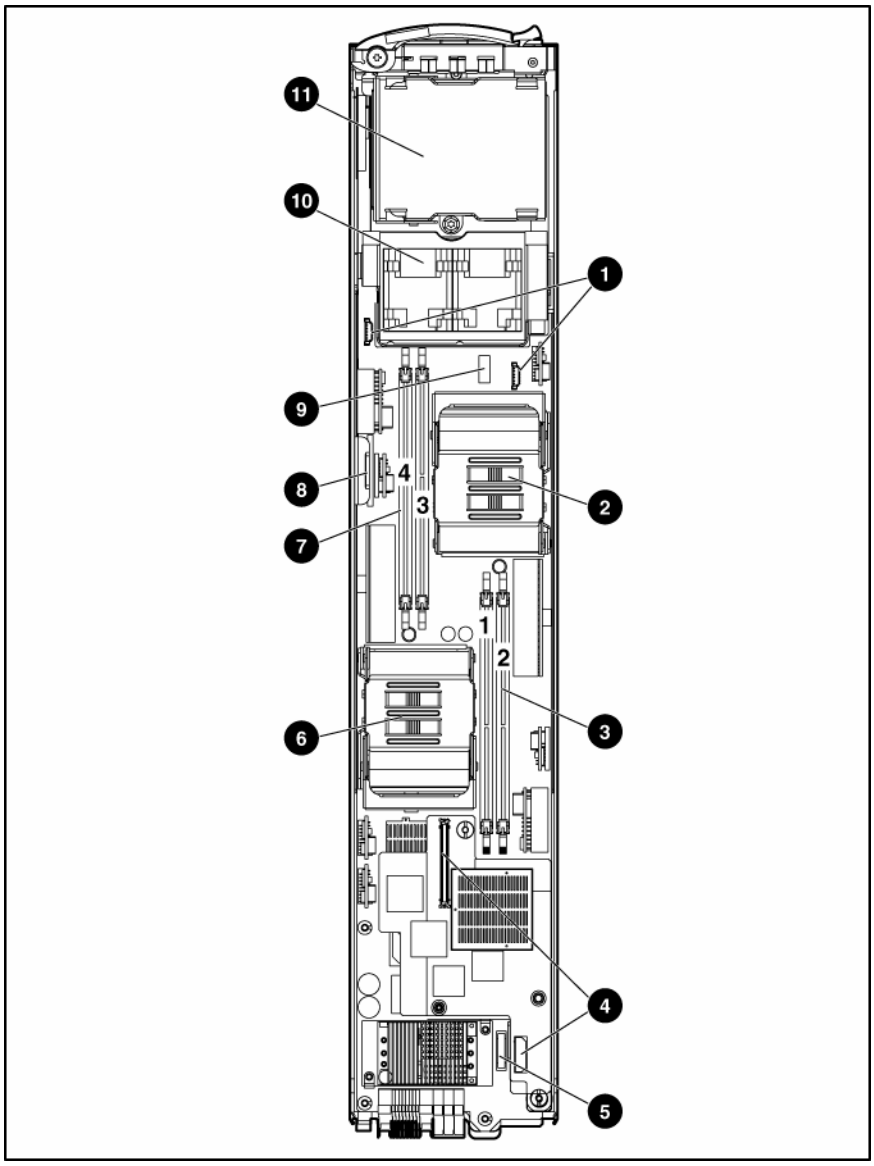


Item	Description	Status
1	UID LED	Blue = Identified Blue flashing = Active remote management Off = No active remote management
2	Internal system health LED	Green = Normal Green flashing = Booting Amber = Degraded condition Red = Critical condition
3	NIC 1 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity

Item	Description	Status
4	NIC 2 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
5	Hard drive activity LED	Green/Flashing = Activity Off = No activity
6	Power On/Standby button LED	Green = On Amber = Standby (auxiliary power available) Off = Off
7	Local I/O port**	—

* Actual NIC numeration depends on several factors, including the operating system installed on the server blade.
** The Local I/O port is used with the local I/O cable for local management and for connecting external devices to the server blade, such as USB keyboard, USB mouse, video monitor, USB diskette drive, and USB CD-ROM drive.

Internal components

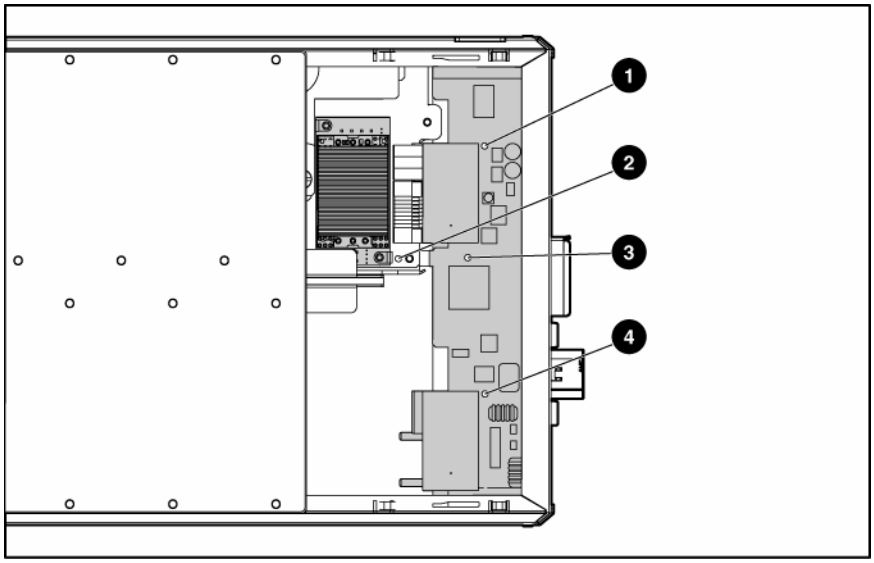


Item	Description
1	Fan assembly connectors (2)
2	Processor socket 2
3	DIMM bank A (populated)
4	Adapter card connectors (2)
5	Battery
6	Processor socket 1 (populated)
7	DIMM bank B
8	Hard drive cable connector
9	System maintenance switch (SW1)
10	Fan assembly
11	Hard drive cage

System maintenance switch

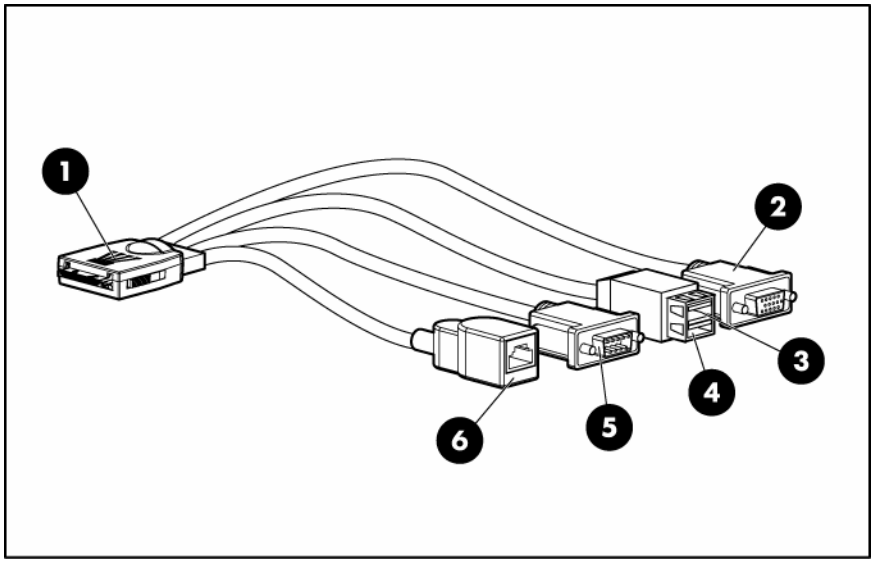
Position	Default	Function
S1	Off	Off = iLO security is enabled. On = iLO security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function On = Clear configuration
S7, S8	Off, Off	Reserved

Sleeve board and server blade LED locations



Item	Description
1	Blade sleeve power LED (CR6)
2	Power converter module LED (CR1)
3	FC LED (CR3)
4	Blade sleeve power LED (CR7)

Local I/O cable

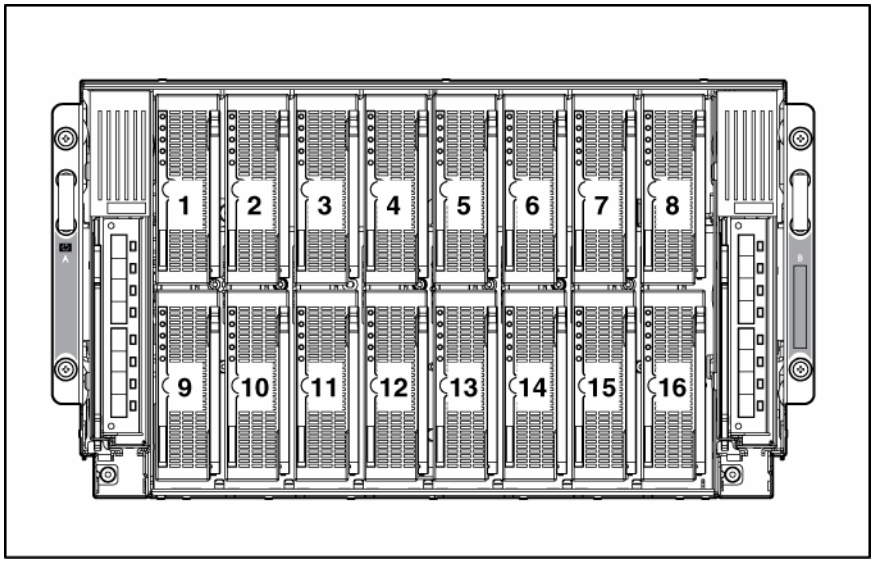


Item	Connector	Description
1	Local I/O	For connecting to the local I/O port on the server blade front panel
2	Video	For connecting a video monitor
3	USB 1	For connecting a USB device
4	USB 2	For connecting a USB device
5	Serial	For trained personnel to connect a null-modem serial cable and perform advanced diagnostic procedures
6	iLO RJ-45 (10/100 Ethernet)	For connecting an Ethernet to the server blade iLO interface from a client device

Server blade enclosure bay numbering

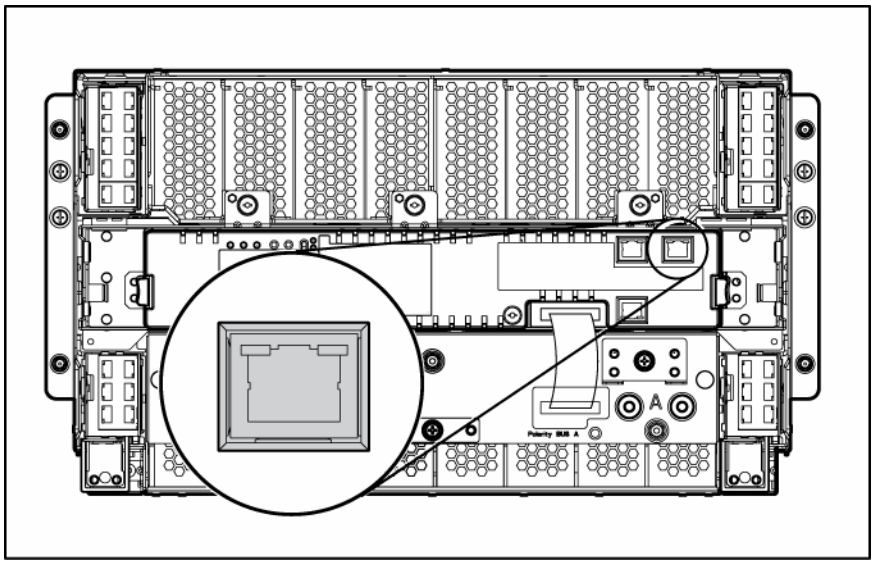
Each server blade enclosure requires a pair of interconnect modules to provide network access for data transfer. Interconnect modules reside in the far right and far left bays of the server blade enclosure. Be sure to review server blade bay numbering to determine the HP ProLiant BL35p Server Blade external network connections on the interconnects.

IMPORTANT: When looking at the rear of the enclosure, server blade bay numbering is reversed.



Server blade enclosure compatibility

The HP ProLiant BL35p Server Blades require the support of an HP BladeSystem p-Class sleeve in a server blade enclosure with enhanced backplane components (enhanced server blade enclosure). The enhanced server blade enclosure also provides a single rear iLO connector for single-cable remote management of all installed HP ProLiant BL35p Server Blades.



For more information about the enhanced server blade enclosure, refer to the *HP ProLiant BL p-Class Server Blade Enclosure Upgrade Installation Guide* or the *HP ProLiant BL p-Class Server Blade Enclosure Installation Guide*.

Operations

In this section

Power up the server blade

By default, the server blade is set to power up automatically when installed in the server blade enclosure. Be sure the server blade is properly installed in a sleeve and is compatible with the server blade enclosure. Refer to "Server blade enclosure compatibility (on page 11)."

If the default setting is changed, use one of the following methods to power up the server blade:

- Press the Power On/Standby button on the server blade front panel.
  - A momentary press initiates a power-up request. The server blade determines power availability from the power subsystem. If required power is available, the server blade powers up.
  - A press of 5 seconds or more initiates a power-up override. The server blade powers up without power availability detection from the system.

CAUTION: Always observe iLO alerts before initiating a power-up override to prevent a hot-plug power supply fault and possible loss of system power. For more information, refer to the *HP Integrated Lights-Out User Guide*.

NOTE: You can perform a server blade power-up override when the management modules are not in use to manage the power-up request. Be sure that sufficient power is available.

- Use the virtual power button features in iLO.
  - A momentary power-up selection
  - A hold power-up selection

  For more information about iLO, refer to "Configuration and utilities (on page 36)."

Power down the server blade

Power down the server blade using either of the following methods:

- Press the Power On/Standby button on the server blade front panel.

  Be sure that the server blade is in standby mode by observing that the power LED is amber. This process may take 30 seconds, during which time some internal circuitry remains active.
- Use the virtual power button feature in iLO.

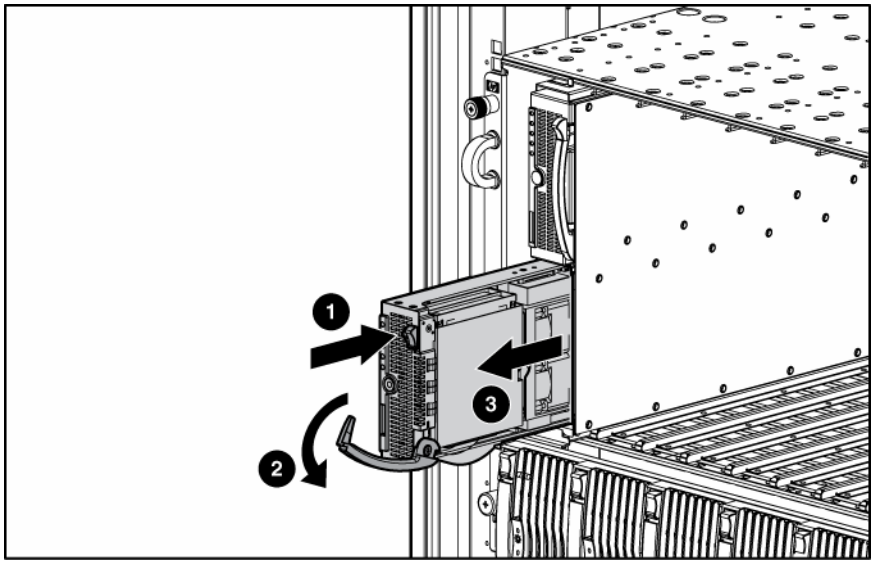
  After initiating a manual or virtual power down command, be sure that the server blade goes into standby mode by observing that the power LED is amber.

IMPORTANT: When the server blade is in standby mode, auxiliary power is still being provided. To remove all power from the server blade, remove the server blade from the server blade enclosure. Removing the sleeve from the server blade enclosure is not necessary.

IMPORTANT: Remote power procedures require the most recent firmware for the power enclosure and server blade enclosure management modules. For the most recent firmware, refer to the HP website (http://www.hp.com/go/support).

Remove the server blade

1. Back up all server blade data.
2. Power down the server blade (on page 12).
3. Remove the server blade from the HP BladeSystem p-Class sleeve.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

Setup

In this section

Installing the HP BladeSystem components

Before performing any server blade-specific procedures, install the HP BladeSystem components in your environment. Refer to the hardware installation and configuration poster that ships with the server blade enclosure.

The most current documentation for server blades and other HP BladeSystem p-Class components is available at the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).

Documentation is also available in the following locations:

- Documentation CD that ships with the server blade enclosure
- HP Business Support Center website (http://www.hp.com/support)
- HP Technical Documentation website (http://docs.hp.com)

Verifying system components

1. Verify that the proper server blade enclosure is installed for the server blade. Refer to "Server blade enclosure compatibility (on page 11)."
2. Verify that adequate power is available. Refer to the HP BladeSystem p-Class power calculator on the HP website (http://www.hp.com/go/bladesystem/powercalculator).

Connecting to the network

To connect the HP BladeSystem to a network, each server blade enclosure must be configured with a pair of network interconnects to manage signals between the server blades and the external network. For more information about interconnect options, refer to the HP website (http://www.hp.com/go/bladesystem/interconnects).

Installing server blade options

Before installing and initializing the server blade, install any hardware options, such as an additional processor or hard drives. For server blade options installation information, refer to "Hardware options installation (on page 18)."

Using the diagnostic station

The diagnostic station provides a method to power up a server blade outside of a server blade enclosure for testing and diagnostic purposes. When using the HP ProLiant BL35p Server Blade with the diagnostic station, observe the following guidelines:

- The sleeve is required.
- The server blade must be installed in the top bay of the sleeve (or the left bay when the sleeve is lying on a flat surface).
- Only one server blade may be installed in the sleeve when connected to the diagnostic station.
- FC connections are not supported.
- The NIC 2 LED is not functional.

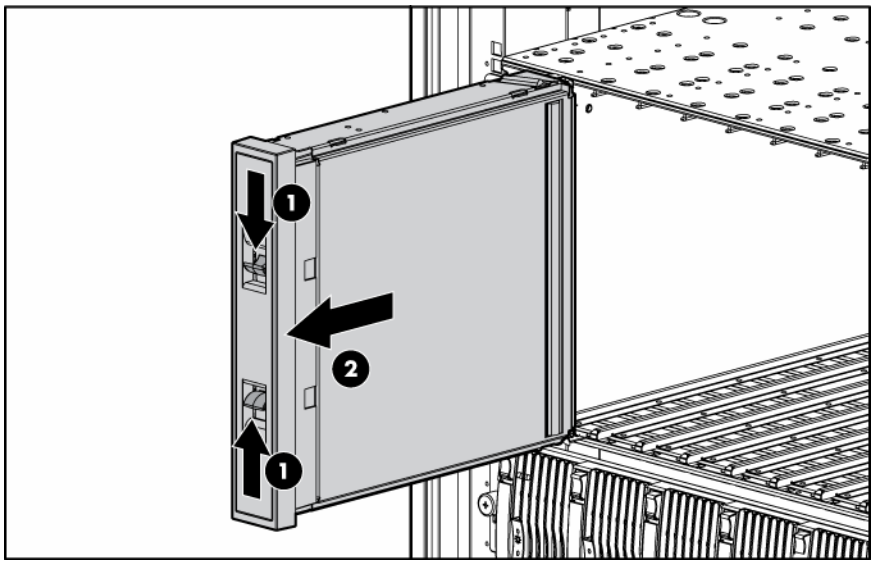
For more information, refer to the documentation that ships with the diagnostic station or refer to the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).

Installing a server blade

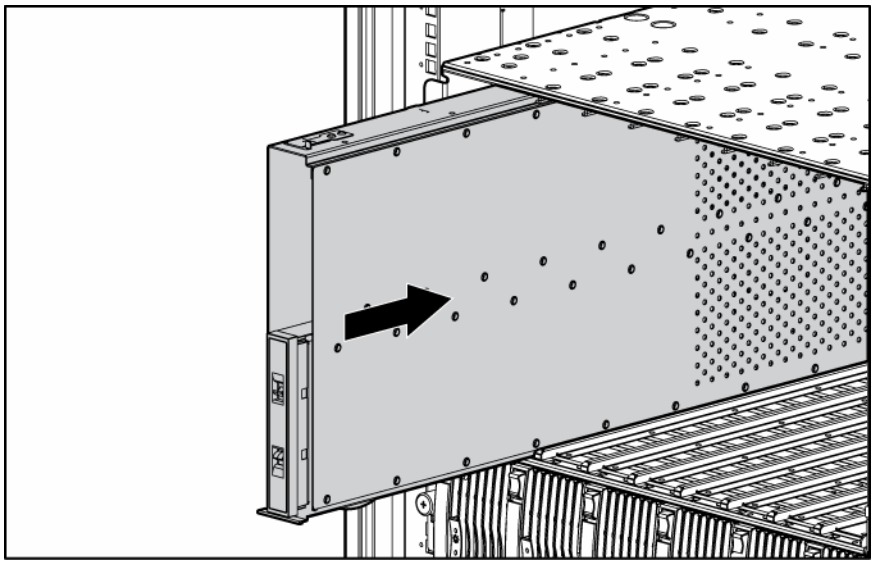
CAUTION: To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

CAUTION: To prevent improper cooling and thermal damage, do not operate the server blade enclosure unless all bays are populated with either a component or a blank.

1. Remove a 6U server blade blank.



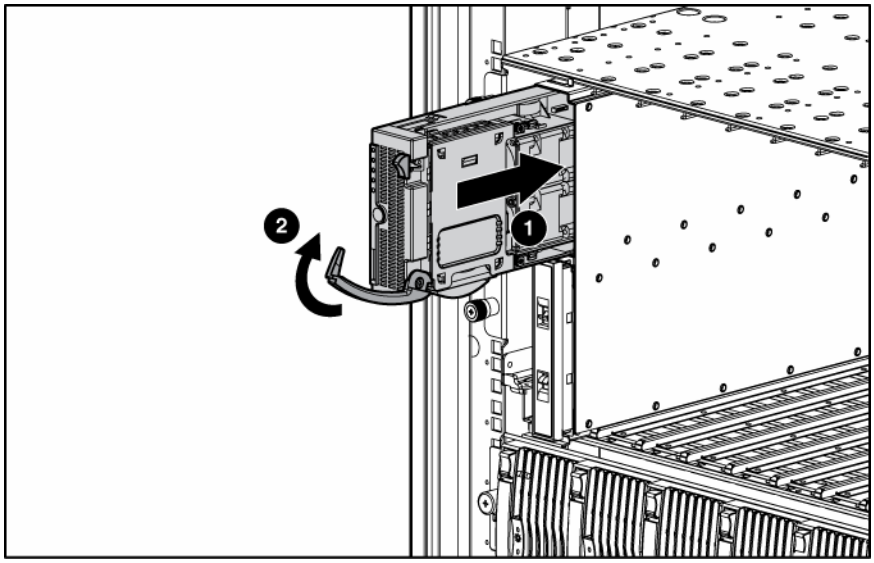
2. Install the HP BladeSystem p-Class sleeve. The sleeve is fully inserted when it locks into place.



NOTE: It is not necessary to remove server blades already installed in the sleeve before installing the new sleeve.

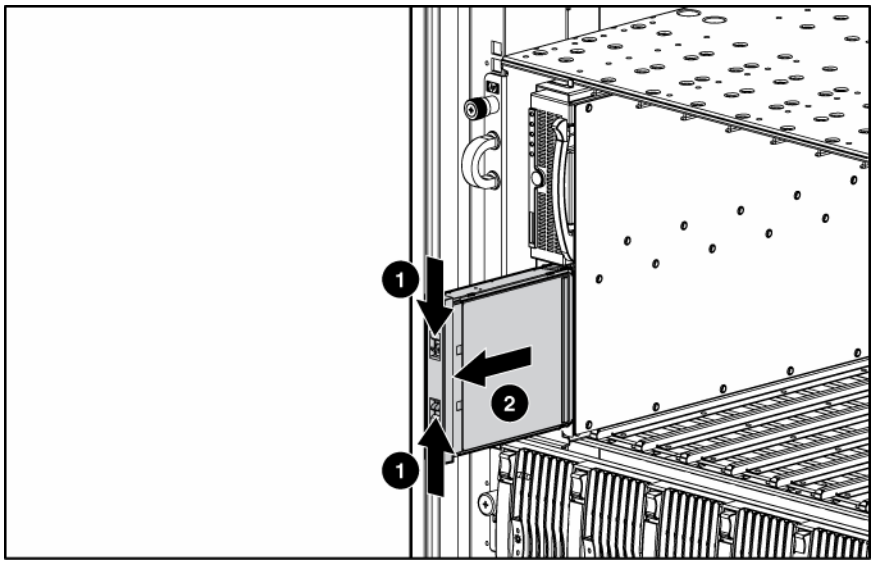
CAUTION: Sleeves and other components are keyed to fit only one way in the enclosure bay. If a component does not slide easily into the bay, check the orientation of the component before reinsertion.

3. Install the server blade.



The default setting for server blades initiates automatic power up when installed in the server blade enclosure.

4. Remove the 3U server blade blank from the sleeve for the lower server blade installation.



Completing the configuration

To complete the server blade and HP BladeSystem configuration, refer to the hardware installation and configuration poster that ships with the server blade enclosure.

Hardware options installation

In this section

Processor option

Use these instructions to install an AMD Opteron™ processor into a supported HP ProLiant p-Class server blade.

NOTE: Some server blade models ship with one processor installed. Use these instructions to install an optional second processor.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

WARNING: This documentation assumes that the server blade is in a server blade enclosure and not receiving power from a diagnostic station. If using a diagnostic station, be sure to disconnect the server blade from the diagnostic station before installing internal components.

CAUTION: ESD can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure.

IMPORTANT: Processor socket 1 must always be populated. If processor socket 1 is empty, the server blade does not power up.

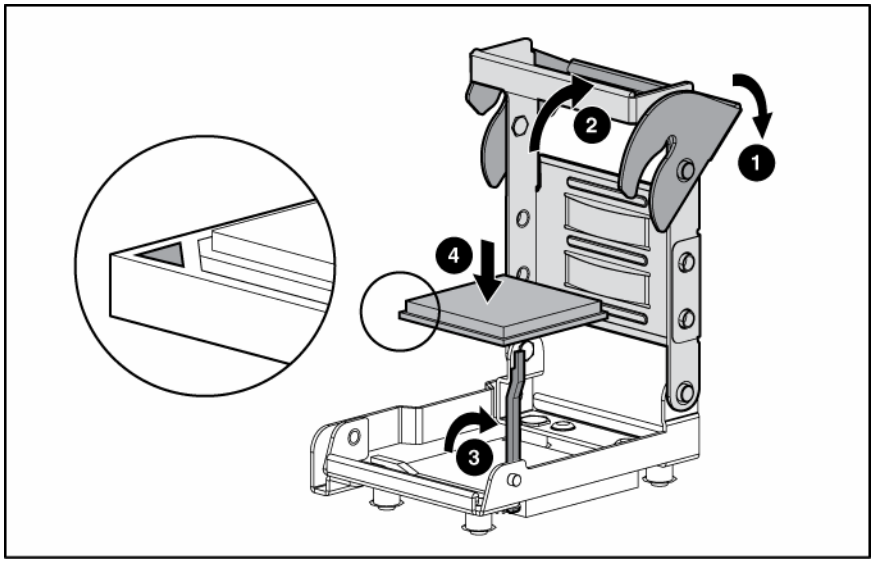
To install the component:

1. Power down the server blade (on page 12).
2. Remove the server blade (on page 13) from the sleeve.
3. Install the processor.

CAUTION: Be sure that the processor socket locking lever is open before installing the processor into the socket.

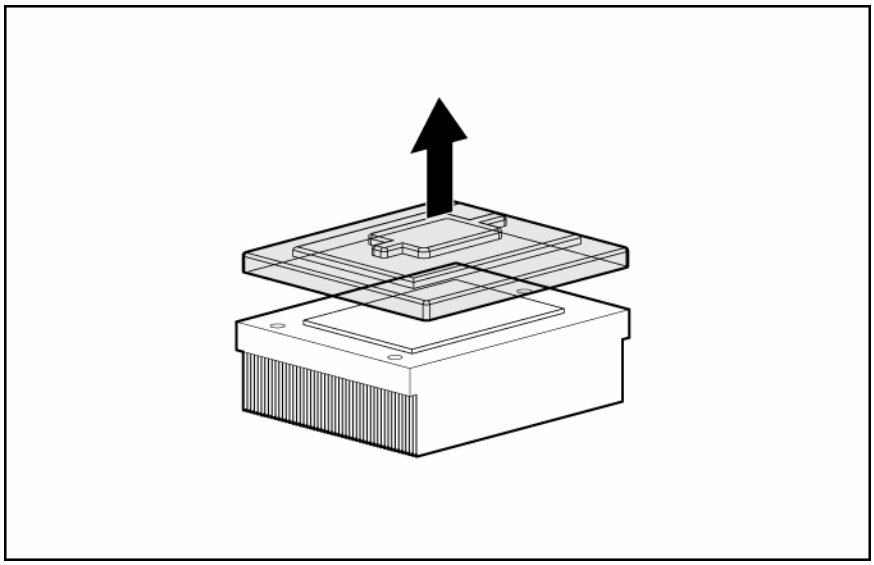
CAUTION: The processor is designed to fit one way into the socket. Use the alignment guides on the processor and socket to properly align the processor with the socket. Refer to the server blade hood label for specific instructions.

△ **CAUTION:** Do not bend or damage the pins beneath the processor.

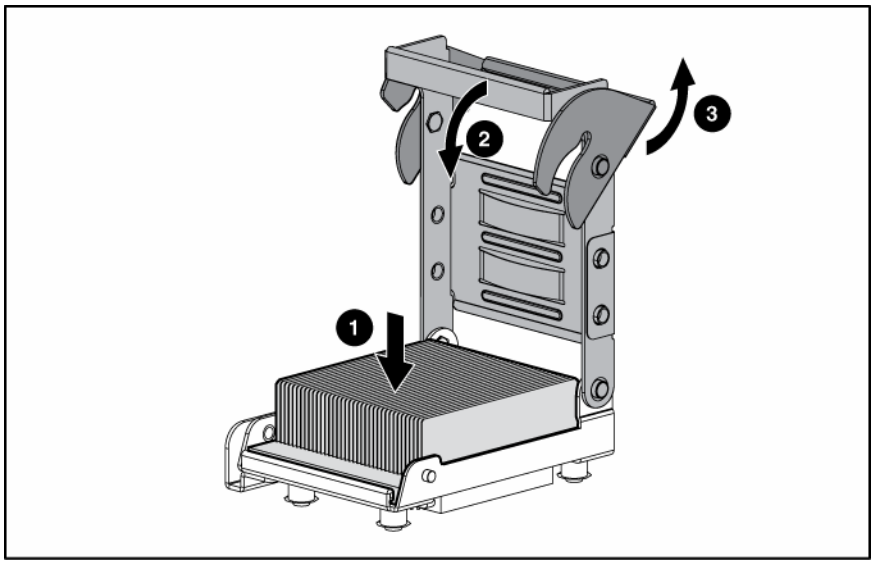


△ **CAUTION:** Be sure that the processor socket locking lever is closed after the processor is installed. The lever should close without resistance. Forcing the lever closed can damage the processor and socket, requiring system board replacement.

4. Close the processor locking lever.
5. Remove the protective cover from the thermal interface.



6. Insert the heatsink and close the processor cage. Closing the processor cage aligns the heatsink.



CAUTION: Removal of the processor or heatsink renders the thermal layer between the processor and heatsink useless. A new heatsink must be ordered and installed before reinstalling the processor.

Memory option

Each processor has a bank consisting of two DIMM slots. The server blade supports up to 8 GB of memory.

CAUTION: Use only HP DIMMs. DIMMs from other sources may adversely affect data integrity.

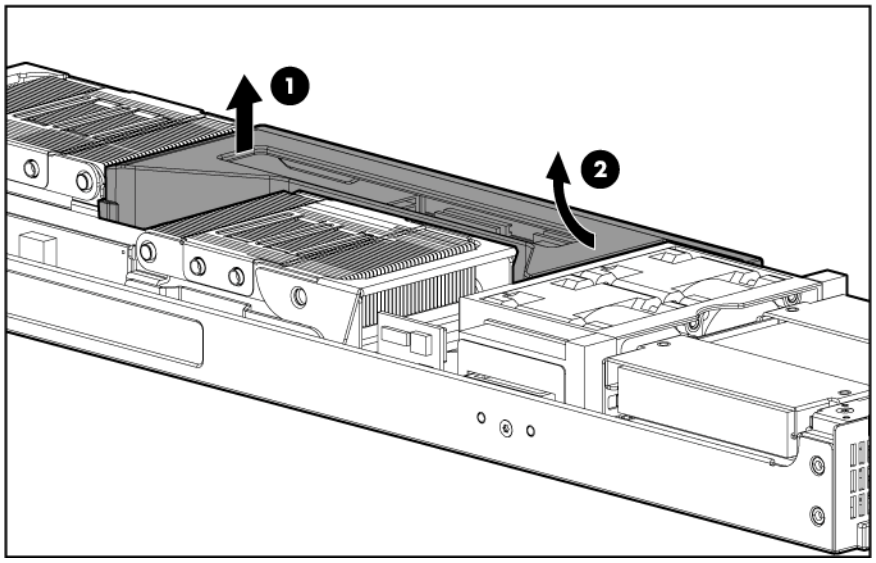
Observe the following DIMM installation guidelines:

- All DIMMs must be the same type. Supported DIMMs include PC3200 DDR 400-MHz SDRAM DIMMs and PC2700 DDR 333-MHz SDRAM DIMMs.
- Both DIMM slots in a bank must be populated.
- Both DIMMs in a bank must be identical.
- DIMM bank A must always be populated.
- DIMM bank B is only active when processor socket 2 is populated.
- For best performance, each processor should have a populated memory bank.

To install the component:

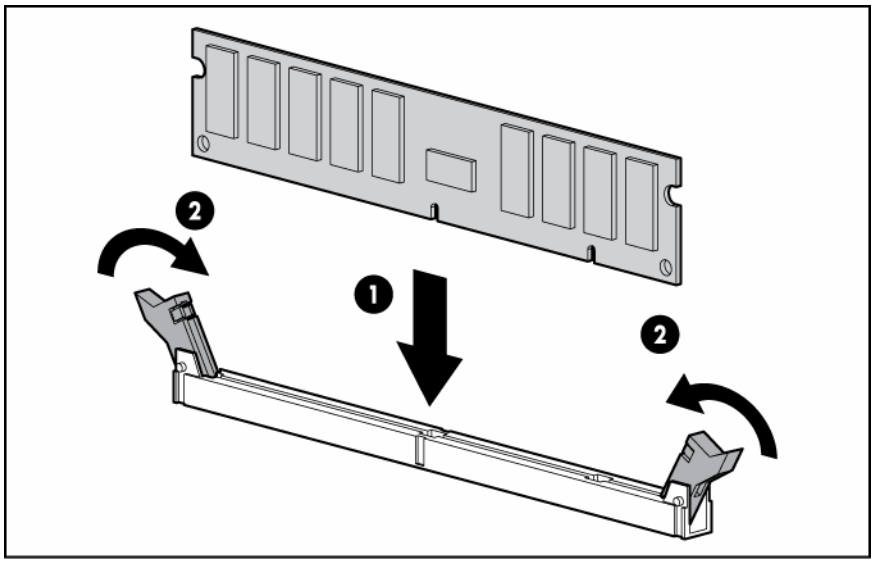
1. Power down the server blade (on page 12).
2. Remove the server blade (on page 13).

3. Remove the air baffle, if necessary.



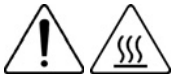
CAUTION: To ensure proper airflow, always install the air baffle when installing a dual-core processor.

4. Open the DIMM slot latches.
5. Install the DIMM.



ATA hard drive option

Use these instructions to install up to two ATA hard drives in the HP ProLiant BL35p Server Blades.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

WARNING: This documentation assumes that the server blade is in a server blade enclosure and not receiving power from a diagnostic station. If using a diagnostic station,

be sure to disconnect the server blade from the diagnostic station before installing internal components.

CAUTION: To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

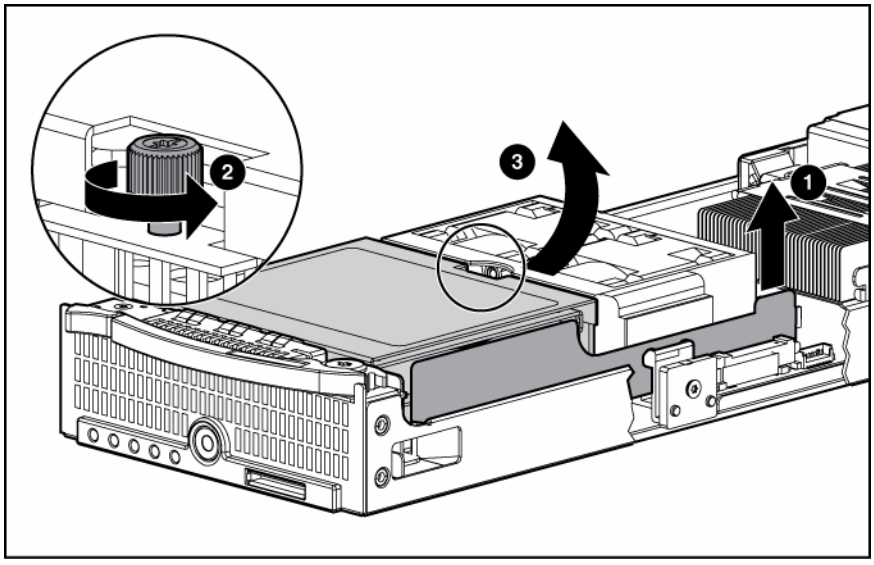
The drive cage assembly lower drive bay is designated as the primary hard drive bay and must be populated first.

Before installing a hard drive, be sure the jumper on the hard drive is set to CS so that the drive device ID is determined by the hard drive connection to the hard drive cable.

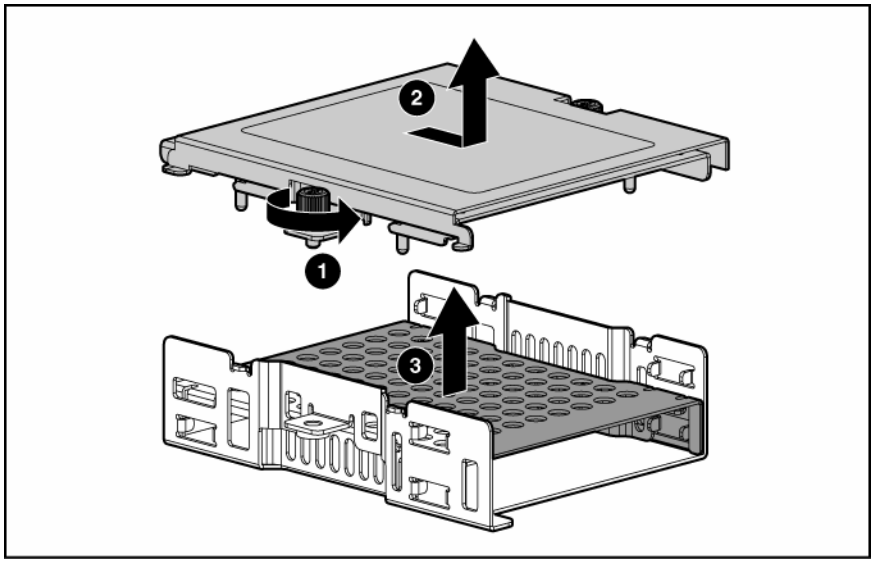
To install the component:

1. Power down the server blade (on page 12).
2. Remove the server blade (on page 13).
3. Remove the drive cage assembly.

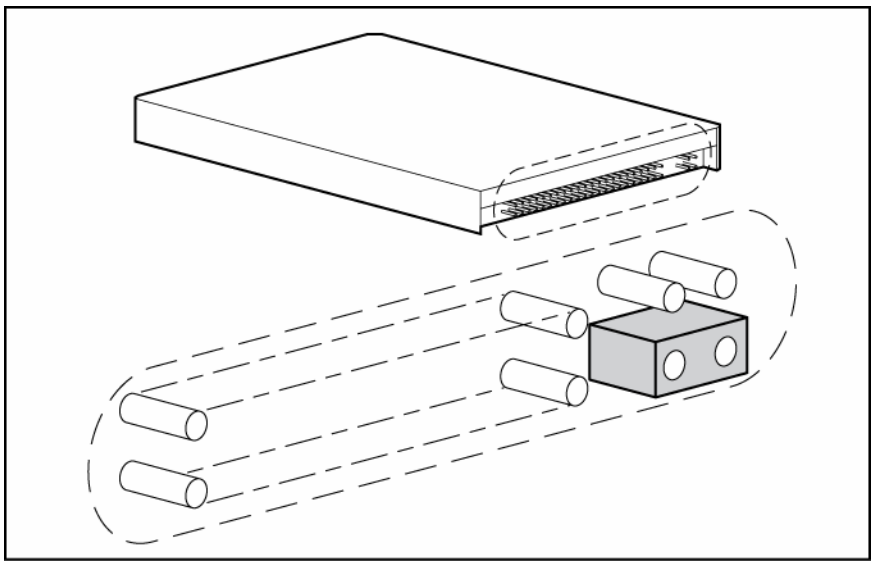
IMPORTANT: Be sure to disconnect the hard drive cable from the system board before removing the drive cage assembly.



4. Remove the cover plate and, if necessary, the center plate.

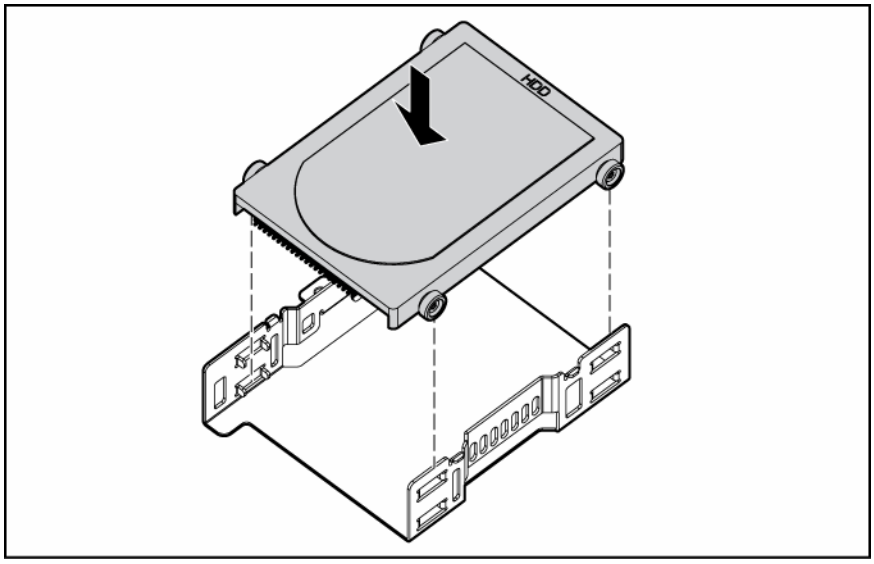


5. Set the jumper on the hard drive to CS, so that the drive device ID is determined by the hard drive cable.



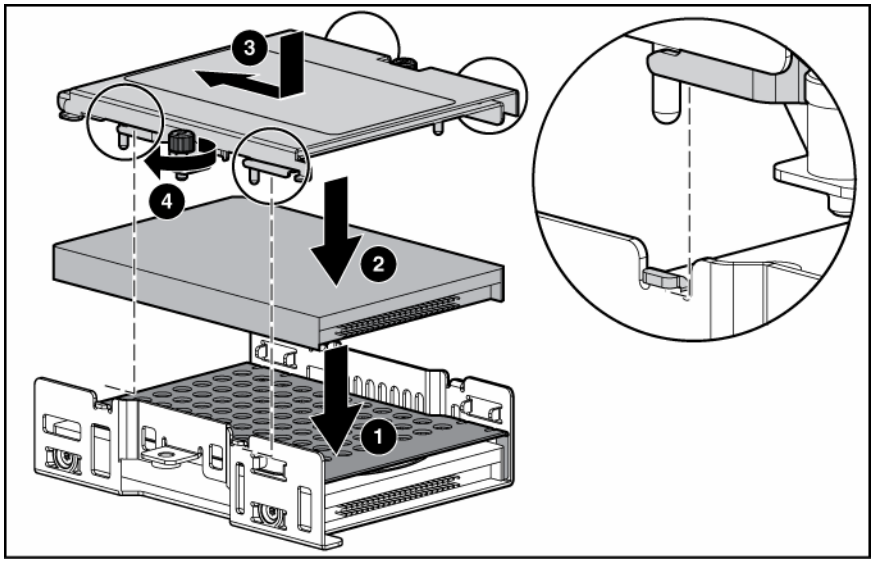
6. Install the hard drive.

IMPORTANT: Be sure the hard drive label is facing up when installed in the drive cage assembly.



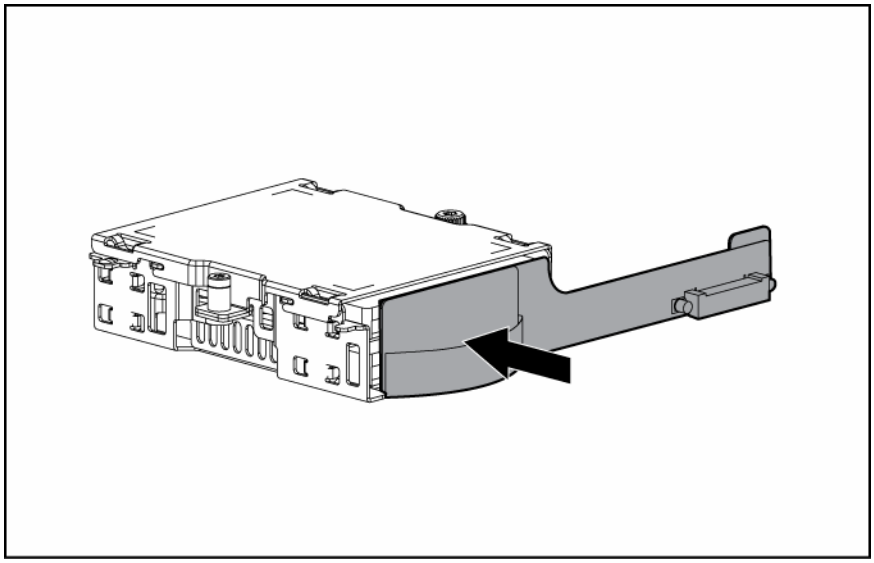
7. Install the center plate and cover plate.

IMPORTANT: Install the optional second hard drive before replacing the cover plate.

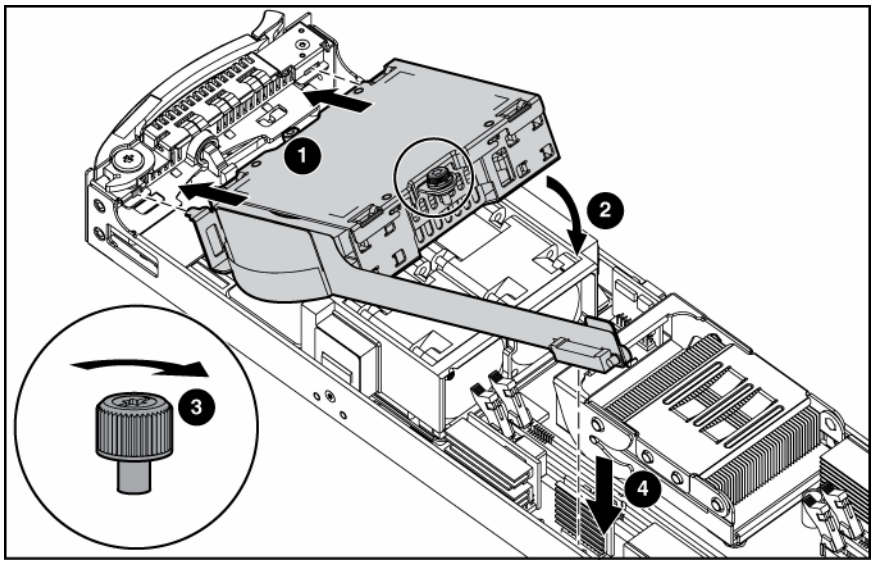


8. Connect the hard drive cable to the hard drives.

IMPORTANT: Be sure the hard drive cable is connected to the hard drives as illustrated.



9. Install the hard drive cage in the server blade.



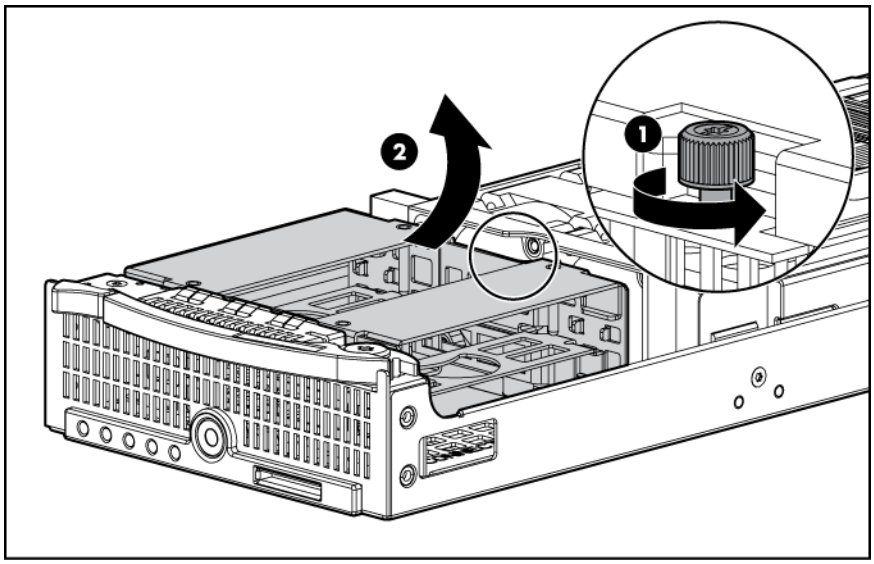
SAS hard drive option

The drive cage assembly lower drive bay is designated as the primary hard drive bay and must be populated first.

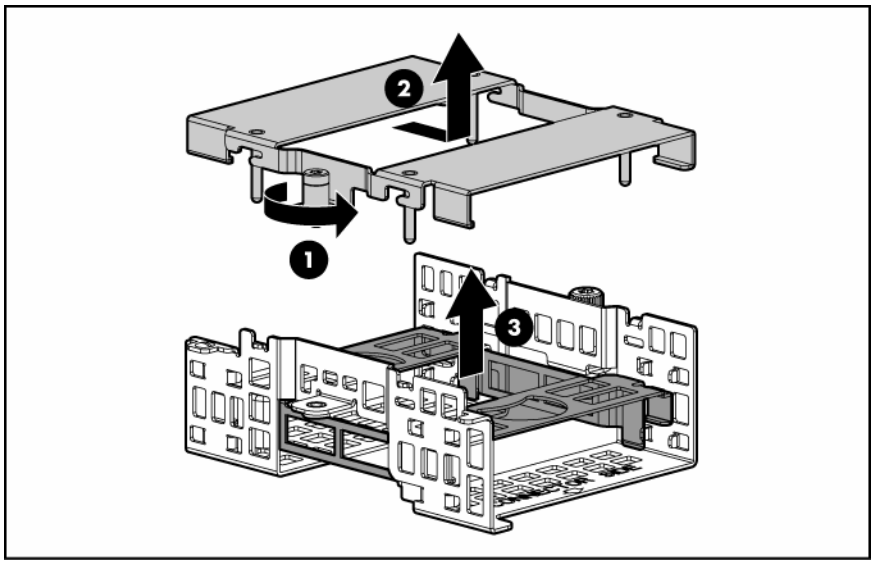
If the server blade is installed, back up all server blade data, power down the server blade, and remove the server blade from the sleeve. For the complete power down and server blade removal procedures, refer to the server blade documentation that shipped with the server blade or the server blade documentation on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info).

To install the component:

1. Power down the server blade (on page 12).
2. Remove the server blade (on page 13) from the sleeve.
3. Remove the drive cage assembly.

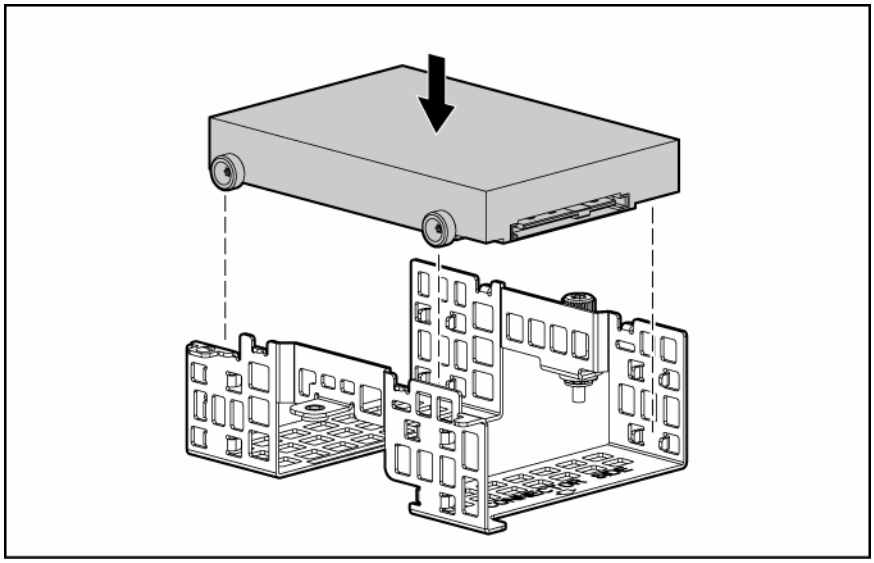


4. Remove the cover plate and, if necessary, the center plate.



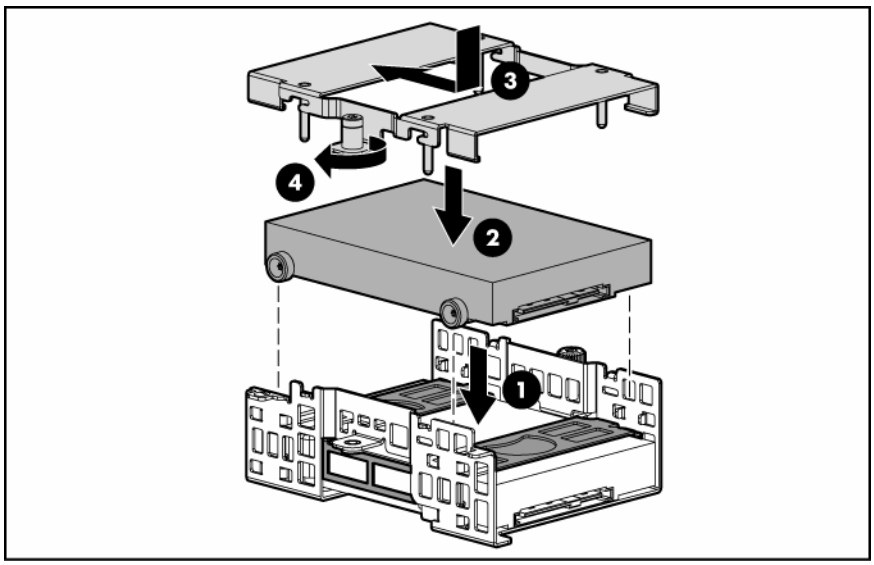
5. Install the hard drive.

IMPORTANT: Be sure the hard drive label is facing up when installed in the drive cage assembly.



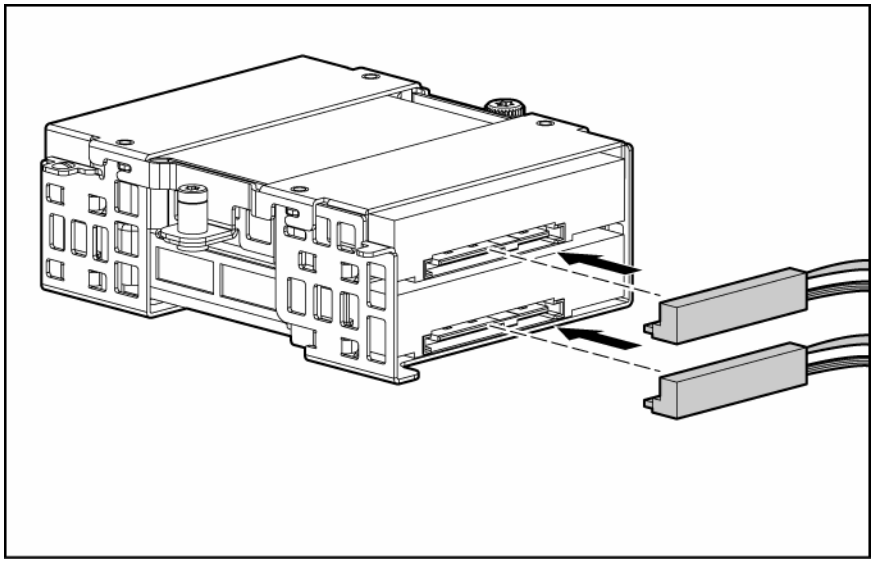
6. Install the center plate and cover plate.

IMPORTANT: Install the optional second hard drive before replacing the cover plate.

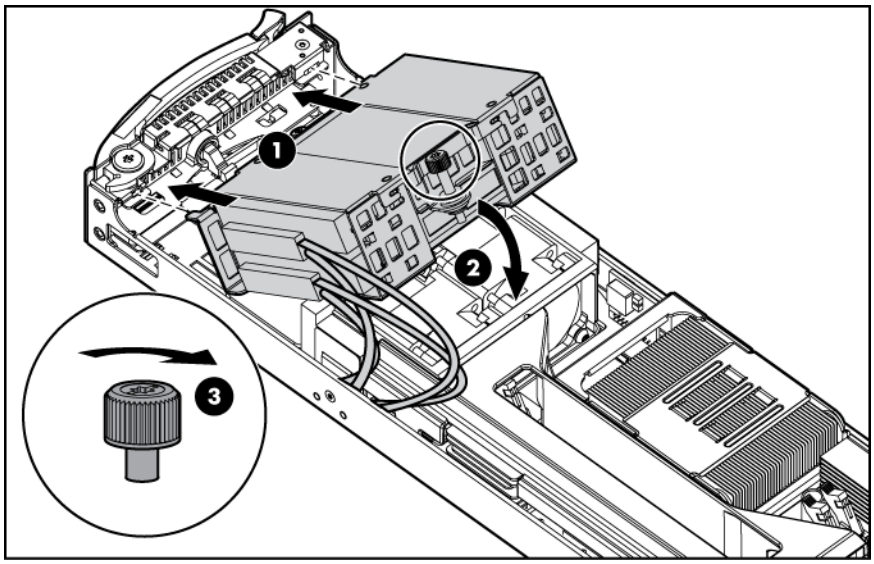


7. Connect the hard drive cable to the hard drives.

IMPORTANT: Be sure the hard drive cable is connected to the hard drives as illustrated.



8. Install the hard drive cage in the server blade.



Dual Port Fibre Channel Adapter (2-GB) option

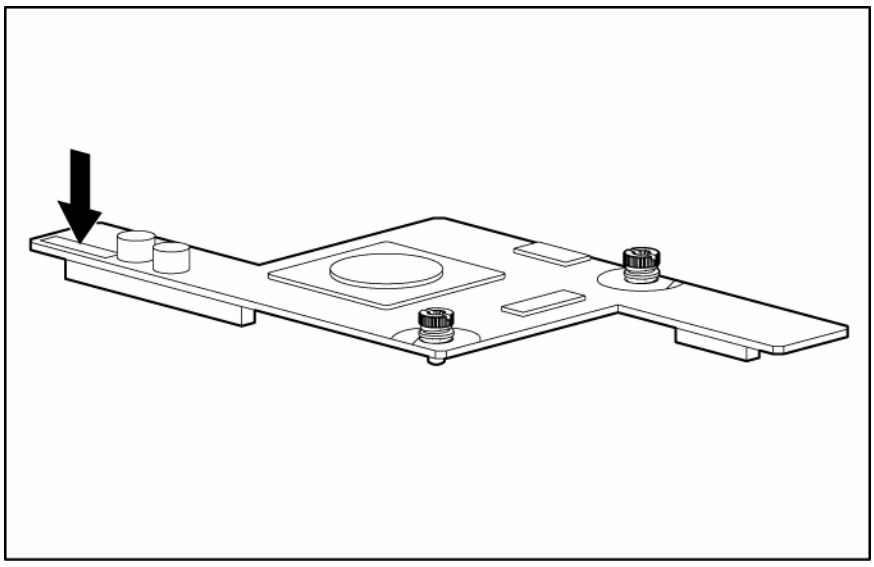
Server blades can be configured for SAN connectivity when used with the following components.

- FC Adapter
- Supported p-Class server blades
- SAN-compatible interconnect
- SFP transceivers (included with the Dual Port FC Adapter)
- Optical FC cables (not included)
- Supported SAN and associated software

For more detailed SAN configuration information for the server blade, refer to:

- The model-specific QuickSpecs document located on the HP ProLiant p-Class server blade products web page at the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
- The HP StorageWorks SAN documentation at the HP website (http://h18006.www1.hp.com/products/storageworks/san/documentation.html)
- The HP p-Class BladeSystem storage website (http://www.hp.com/go/bladesystem/storage)

1. Before installing the component refer to the label on the FC adapter to verify compatibility with the server blade.

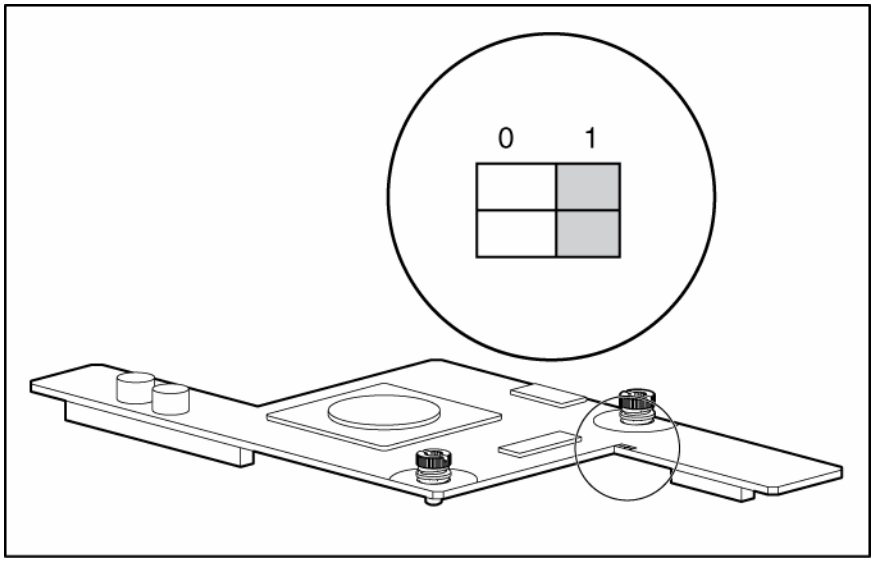


2. Back up all server blade data.
3. Be sure that the server blade has the most recent ROM version.

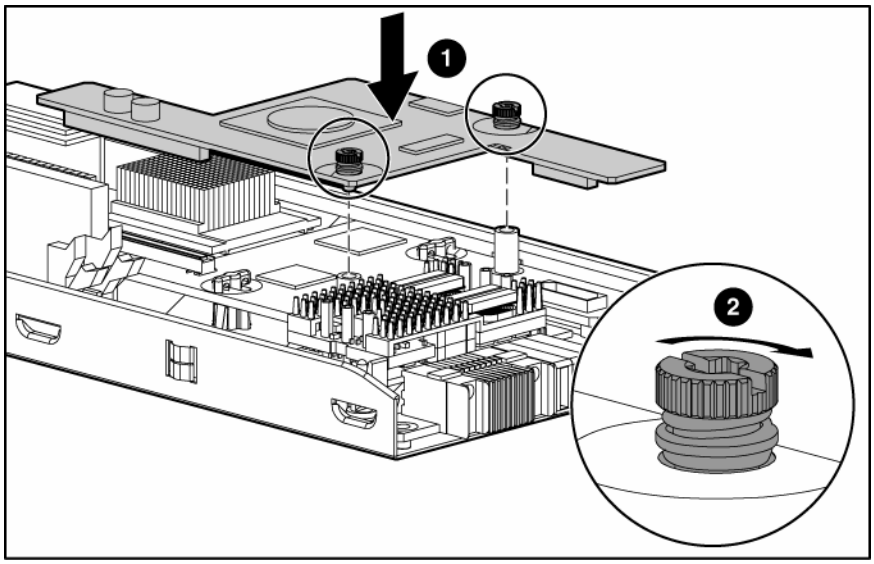
CAUTION: Be sure that you have the current version of the system ROM. Without the correct firmware version, the server and hardware options may not function properly. For the most current version of the ROM, go to the HP website (http://www.hp.com/support).

4. Power down the server blade (on page 12).
5. Remove the server blade (on page 13) from the sleeve.
6. For the Emulex-based FC adapter, set the server selector switch.

IMPORTANT: Be sure both server selector switches are set to 0 or both server selector switches are set to 1.



7. Install the FC adapter.



Refer to Internal components (on page 8) for the location of the FC adapter connectors.

The HP ProLiant BL35p Server Blade requires specific Microsoft® Windows® SAN drivers to support an optional dual port Fibre Channel adapter.

To download the most current SAN driver, begin by referring to the HP support website (http://www.hp.com/support/files).

At the support website, enter the product name, select the task to download drivers and software, and follow the on-screen instructions.

Multifunction network adapter option

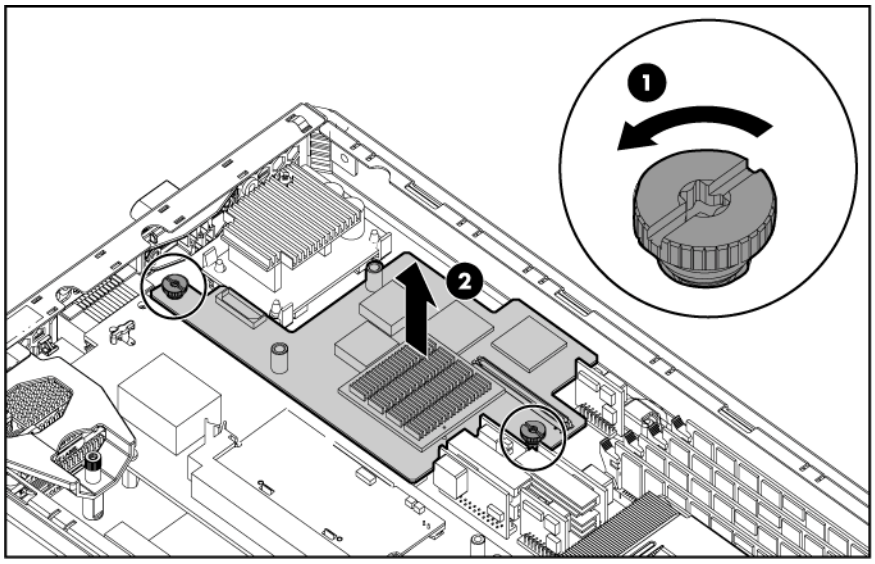
Before installing the component:

1. Back up all server blade data.
2. Be sure that the server blade has the most recent ROM version.

CAUTION: Be sure that you have the current version of the system ROM. Without the correct firmware version, the server and hardware options may not function properly. For the most current version of the ROM, go to the HP website (http://www.hp.com/support).

3. Power down the server blade (on page 12).
4. Remove the server blade (on page 13) from the sleeve.
5. Remove the standard NIC mezzanine card.

△ **CAUTION:** Be sure to lift the board straight up. Lifting one edge of the board at a time may damage the connectors.



6. Install the multifunction network adapter.
7. Install the FC adapter, if necessary.

Local I/O cabling

In this section

Using the local I/O cable

The local I/O cable enables the user to perform server blade administration, configuration, and diagnostic procedures in two ways:

- Connecting locally to the server blade iLO interface
- Connecting video and USB devices directly to the server blade

Local administration using iLO

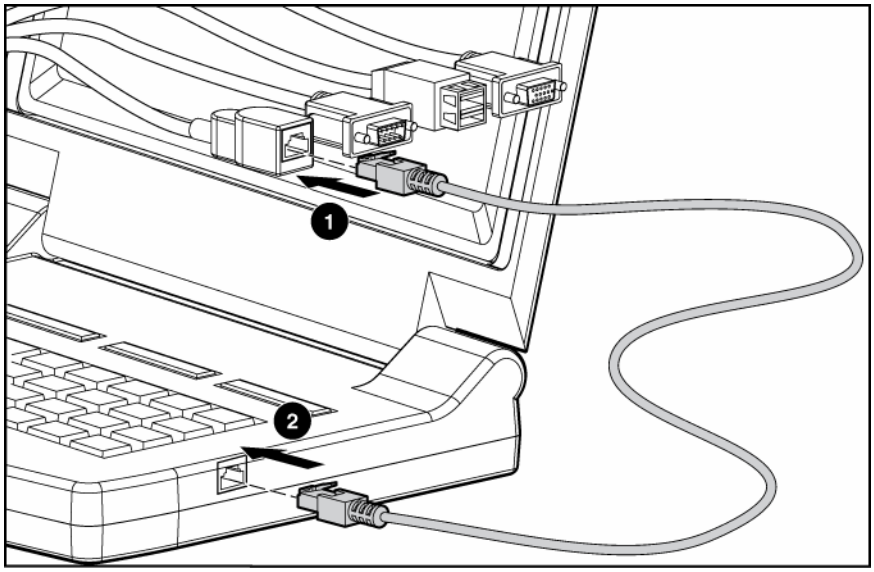
To connect locally to iLO with the local I/O cable, you must have the following:

- A client device with a 10/100 Ethernet RJ-45 connector
- A network cable with RJ-45 connectors

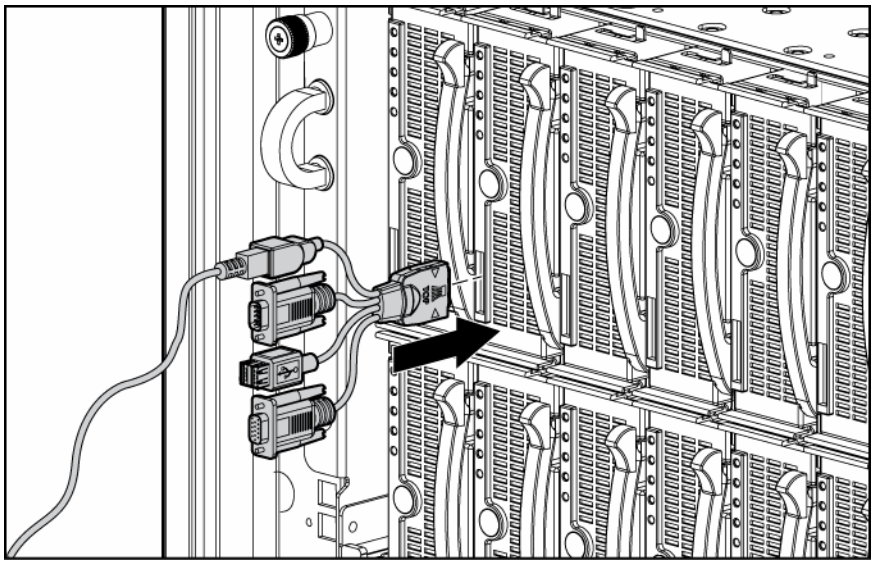
To connect to iLO:

△ **CAUTION:** Do not connect the local I/O cable to a hub when connecting to iLO. All server blades have the same IP address through the I/O port. Multiples on a hub make the server blades indistinguishable on the network.

1. Use the RJ-45 network cable to connect the local client device to the local I/O cable.



2. Connect the local I/O cable to the I/O port on the server blade.



CAUTION: Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear iLO connector performance degrades when the local I/O cable is connected, even if the iLO connector on the cable is not in use.

CAUTION: Before disconnecting the local I/O cable, observe the following guidelines:

- Completely log out of the current iLO session before disconnecting from the iLO port. Do not remove the local I/O cable when the UID LED is flashing.
- Always squeeze the locking buttons on the side of the server blade connector before disconnecting from the I/O port. Failure to do so can result in damage to the equipment.

Connecting locally to a server blade with video and USB devices

Use the local I/O cable to connect any of the following USB devices to the server blade:

- Monitor
- USB hub
- USB keyboard
- USB mouse
- USB CD-ROM drive
- USB diskette drive
- USB drive key

Numerous configurations are possible. This section offers two possible configuration examples.

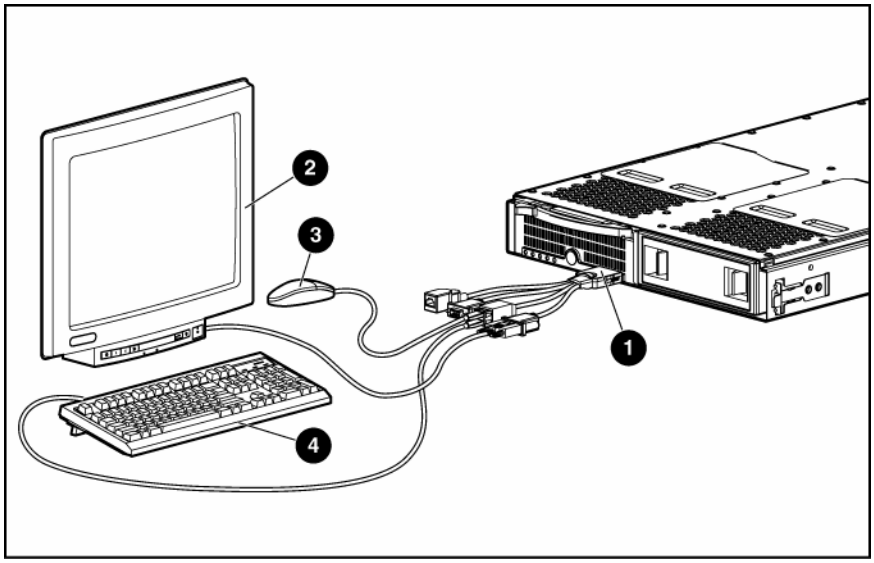
Server blade administration using local KVM (example)

This example shows the server blade attached to the diagnostic station. Be sure to review the guidelines and limitations of using the diagnostic station (on page 15).

CAUTION: Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear iLO connector performance degrades when the local I/O cable is connected, even if the iLO connector on the cable is not in use.

NOTE: For this configuration, a USB hub is not necessary. To connect additional devices, use a USB hub.

1. Connect the local I/O cable to the server blade.
2. Connect the video connector to a monitor.
3. Connect a USB mouse to one USB connector.
4. Connect a USB keyboard to the second USB connector.



Item	Description
1	Server blade
2	Monitor
3	USB mouse
4	USB keyboard

Server blade deployment using local media devices

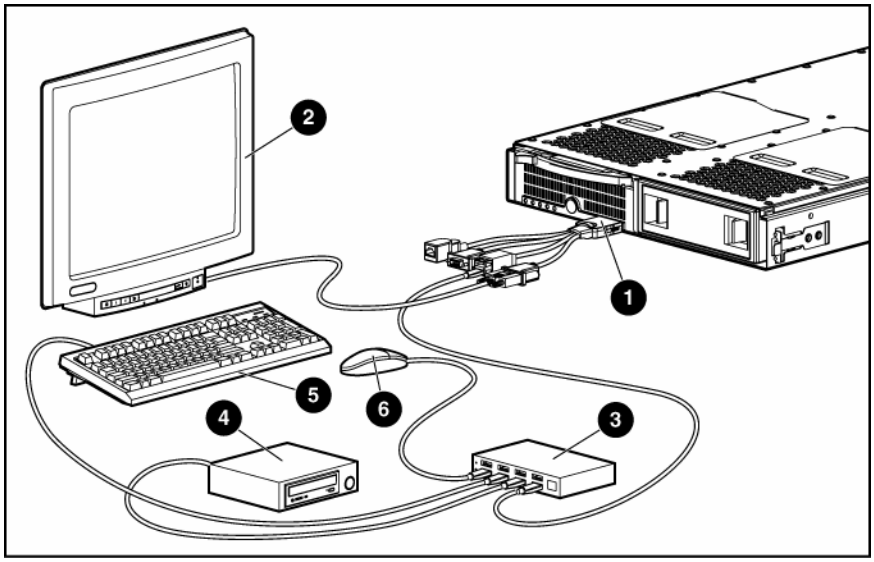
This example shows the server blade attached to the diagnostic station. Be sure to review the guidelines and limitations of using the diagnostic station (on page 15).

Use the following configuration when configuring a server blade or loading software updates and patches from a CD-ROM, such as the SmartStart CD, or a diskette.

CAUTION: Disconnect the local I/O cable when not in use. The port and connector do not provide a permanent connection. Rear iLO connector performance degrades when the local I/O cable is connected, even if the iLO connector on the cable is not in use.

1. Connect the local I/O cable to the server blade.
2. Connect the video connector to a monitor.
3. Connect a USB hub to one USB connector.
4. Connect the following to the USB hub:
   - USB CD-ROM drive
   - USB keyboard
   - USB mouse

NOTE: Use a USB hub when connecting a USB diskette drive and/or USB CD-ROM drive to the server blade. The USB hub provides additional connections.



Item	Description
1	Server blade
2	Monitor
3	USB hub
4	USB CD-ROM drive or USB diskette drive
5	USB keyboard
6	USB mouse

Configuration and utilities

In this section

SAS BIOS configuration utility

SAS BIOS features

The SAS BIOS is the bootable ROM code that manages SAS hardware resources. It is specific to a family of SAS controllers or processors. The SAS BIOS integrates with a standard system BIOS, extending the standard disk service routine provided through INT13h.

During the boot time initialization, the SAS BIOS determines if the system BIOS has already installed other hard disks, such as an IDE drive. If other drives are already installed, the SAS BIOS maps any SAS drives it finds behind these drives. Otherwise, the SAS BIOS installs drives starting with the system boot drive, and then the system boots from a drive controlled by the SAS BIOS.

Boot initialization with the BBS

The SAS BIOS supports the BIOS boot specification (BBS). If the system supports the BBS, use the system BIOS setup menu to select the boot order and drive order. In the system BIOS setup, the Boot Connection Devices menu lists the available boot options. Select the device and boot order. Exit to continue the boot process.

Starting the SAS BIOS configuration utility

SAS BIOS 6.xx with the SAS BIOS configuration utility enables the default configuration of the SAS host adapters to be changed. The default values can be changed if they conflict with other device settings or if system performance needs optimizing. The version number of the SAS BIOS is displayed during bootup. The following message is displayed:

```
Press F8 to start LSI Logic Configuration Utility...
```

NOTE: The exact key sequence may be different for different version numbers.

This message remains on the screen for five seconds, allowing time to start the utility by pressing **F8**. The screen displays the following message:

```
Please wait, invoking LSI Logic Configuration Utility...
```

After a pause, the SAS BIOS configuration utility opens.

The following messages can appear during the boot process:

- `Adapter removed from boot order!`

  This message displays when an adapter was removed from the system or was relocated behind a PCI bridge.

- `Adapter configuration may have changed, reconfiguration is suggested!`

  This message displays when fewer than four adapters are in the boot order list and more adapters exist than are shown.

The SAS BIOS configuration utility can detect devices that the SAS BIOS cannot control. (For example, tape drives and scanners require their own specific drivers.) However, the configuration utility can still be used to modify certain parameters for these devices.

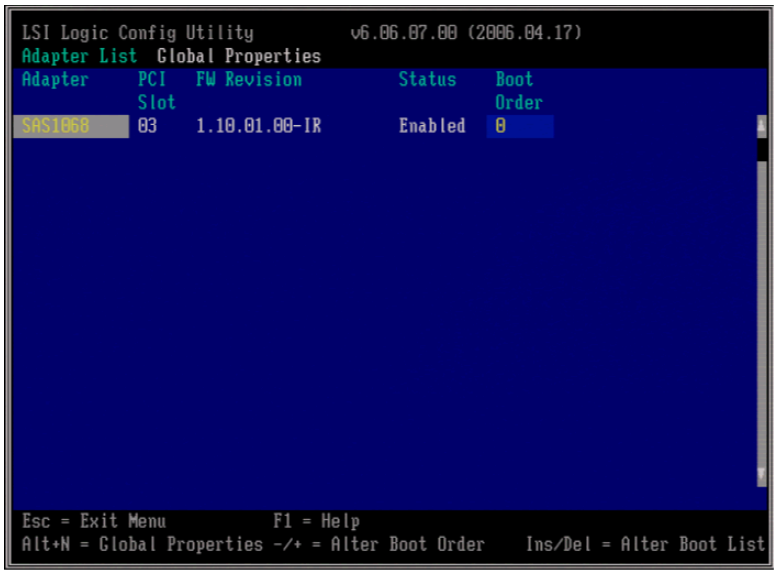
Configuration utility screens

All SAS BIOS configuration utility screens contain the following areas, starting at the top of the screen:

- Header—Identifies the utility and version number.
- Menu—Displays the title of the current screen and also identifies the adapter on screens other than the Adapter List screen.
- Main area—The main area for presenting data. This area has a cursor for item selection, and horizontal and vertical scroll bars if necessary.
- Footer—Provides general help information text.

Adapter List screen

The Adapter List screen is the first screen to display when the SAS BIOS configuration utility opens. The screen provides information about each adapter installed in the system.



If the host bus adapter is configured as the active boot controller in RBSU, the following actions are possible:

- Changing the position of an adapter in the boot order sequence by moving the cursor to the Boot Order field of the adapter, and then pressing **-** or **+**.
- Adding an adapter to the Boot Order list by moving the cursor to the Boot Order field of the adapter, and then pressing **Ins**.

- Removing an adapter from the Boot Order list by moving the cursor to the Boot Order field of the adapter, and then pressing **Del**.

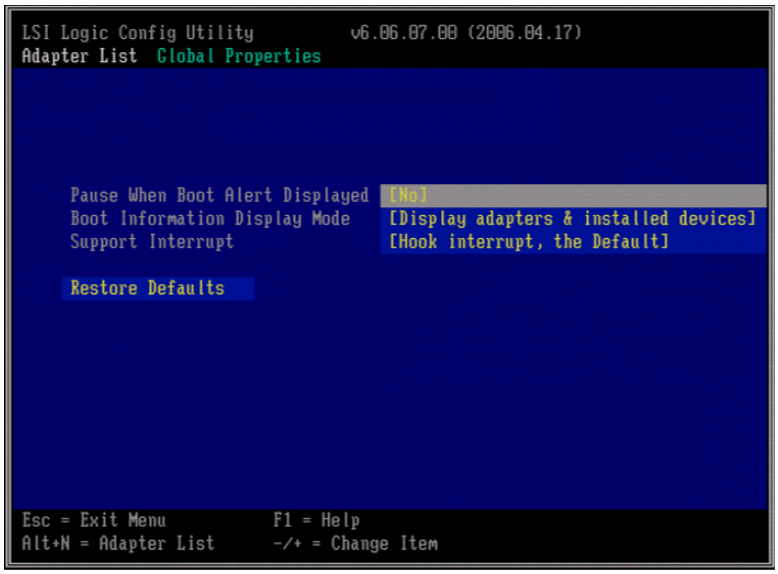
Changes must be saved before exiting the screen.

The Adapter List screen is also the gateway to three other screens:

- The Global Properties screen (on page 38)
- The Adapter Properties screen (on page 39)
- The Exit Menu screen (on page 44)

Global Properties screen

Use the Global Properties screen to change global scope settings. To access the Global Properties screen, press **Alt**+**N** on the Adapter List screen.



Field	Description
Pause when Boot Alert Displayed	This option specifies whether the BIOS pauses for user acknowledgment after displaying an alert message during the boot process. Possible values: • No (BIOS continues after a message is displayed.) • Yes (User must press a key for BIOS to continue after a message is displayed.)
Boot information display mode	This option controls how much information the BIOS displays about adapters and devices during the boot process. Possible values: • Display adapters only • Display adapters and all devices • Display minimal information • Display adapters and installed devices
Support interrupt	This option enables prevention of a hook on INT40, if required. Possible values: • Hook interrupt (default) • Bypass interrupt hook
Restore defaults	Press **Enter** while this field is selected to return the values in the others fields on this screen to their default settings.

To exit the Global Properties screen:

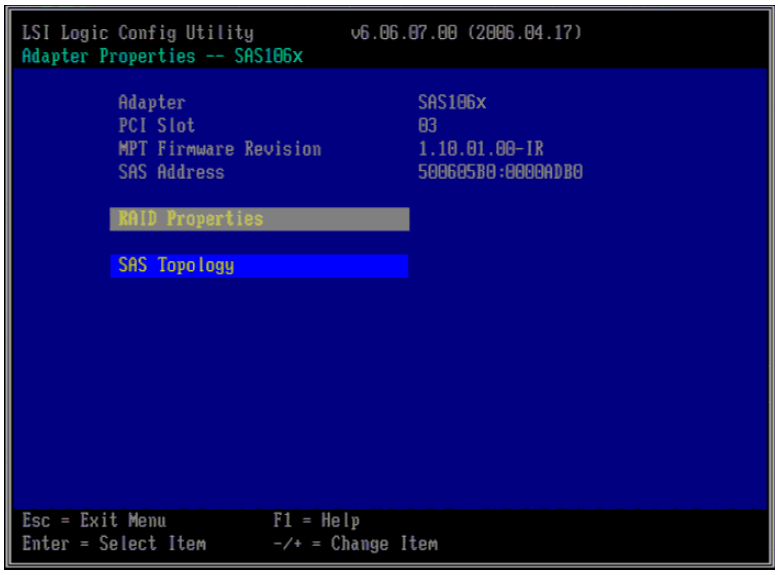
- To return to the Adapter List screen, press **Alt**+**N**.

- To access the Exit Menu screen, press **Esc**.

Adapter Properties screen

Use the Adapter Properties screen to view information about the adapter and determine whether the adapter is to be controlled by the OS driver, the BIOS, or both.

To access the Adapter Properties screen, use the arrow keys to move the cursor to an adapter in the Adapter List field on the Adapter List screen, and then press **Enter**.



The options for the Boot Support setting are:

- Enabled BIOS & OS (default): The adapter is controlled by both the BIOS and the operating system driver.
- Enabled BIOS Only: The adapter is controlled only by the BIOS, not by the OS driver. Some OS drivers do not support this setting. For example, a Microsoft® Windows® driver cannot be prevented from controlling the adapter.
- Enabled OS Only: The adapter is controlled by the OS driver, not by the BIOS.
- Disabled: The BIOS does not control the adapter when loaded. However, the adapter is visible through the Configuration Protocol.

Changes to this setting are reflected in the Status field on the Adapter List screen. The new setting does not take effect until the system is rebooted.

Also use this screen to access other screens in the utility that enable you to perform RAID volume configuration and management tasks or view information about the SAS topology of the adapter.

- To access the RAID Properties screen, move the cursor to the RAID Properties field, and then press **Enter**.
- To access the SAS Topology screen, move the cursor to the SAS Topology field, and then press **Enter**.

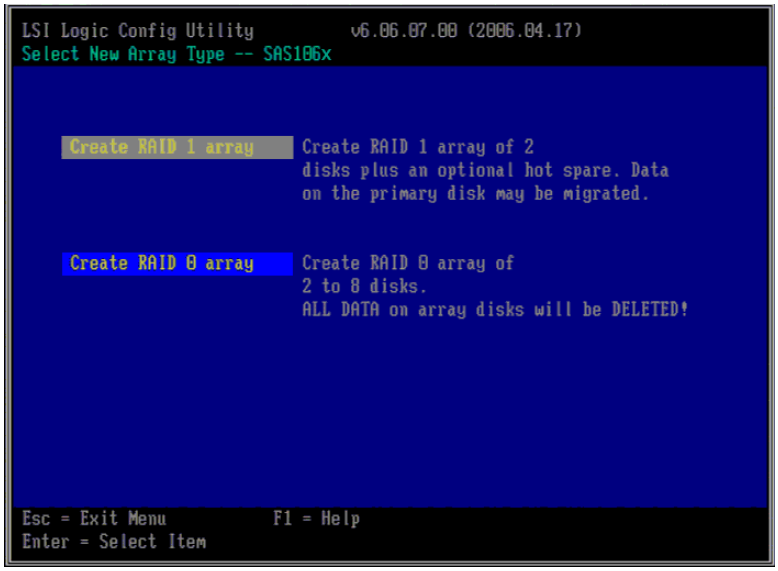
RAID Properties screen

One of the following screens is displayed when the RAID Properties link on the Adapter Properties screen is selected:

- If no RAID volumes are currently configured, the Select New Array Type screen is displayed.
- If at least one RAID volume is currently configured, the View Array screen is displayed.

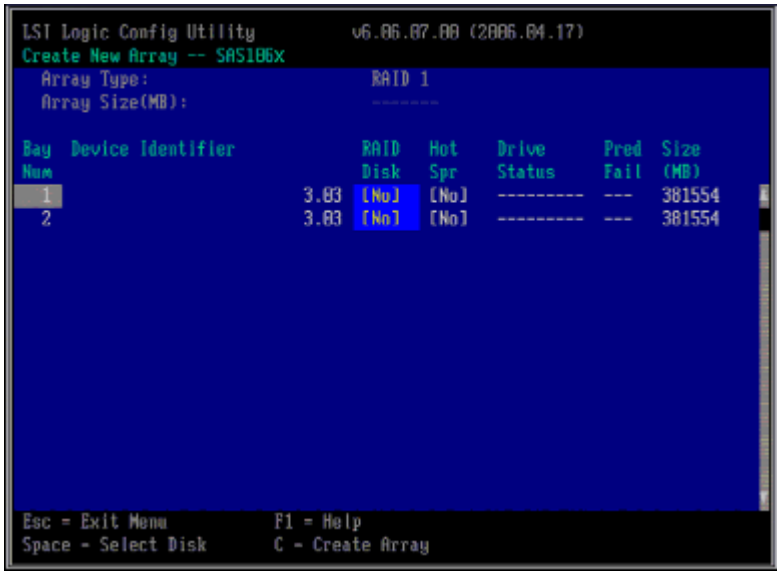
Select New Array Type screen

This screen describes the types of RAID volumes that can be created. Move the cursor to either the Create Raid 1 Volume field or the Create Raid 0 Volume field, and then press **Enter** to display the Create New Array screen.



Create New Array screen

Use the Create New Array screen to select the disk drives for the new array.



For a RAID 1 volume, choose one of the following options when adding the first disk:

- To keep the existing data and migrate to a RAID 1 array, press **M.** Disk synchronization occurs.

CAUTION: Pressing **D** deletes the data on all disks in the array.

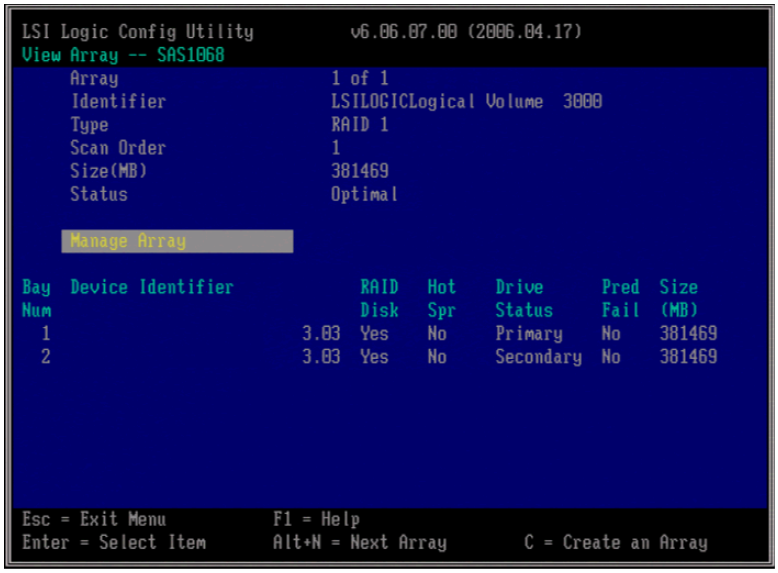
- To overwrite existing data and create a new RAID 1 array, press **D.** No synchronization occurs.

After the volume is configured, press **C** to create the array. When array creation is complete, the utility returns to the Adapter Properties screen.

View Array screen

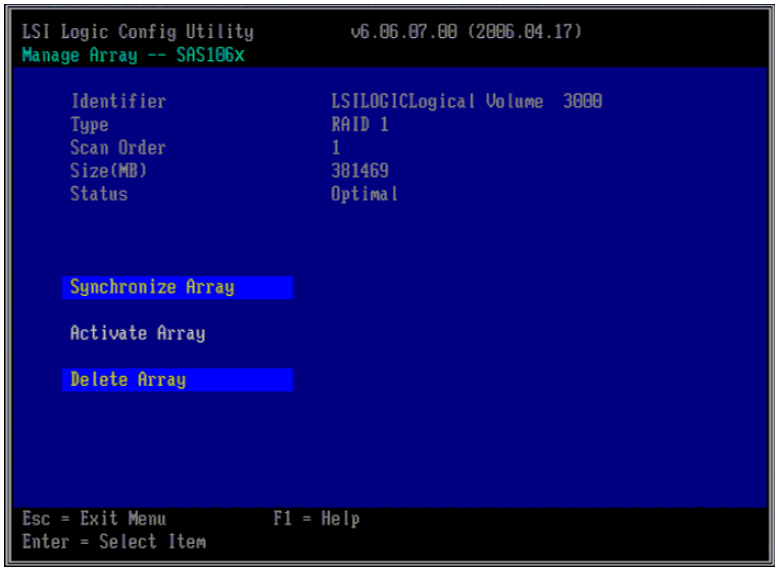
The View Array screen displays the current array configuration and provides access to the Manage Array screen.

- To view the next array, press **Alt**+**N**.
- To perform management tasks on this array, move the cursor to the Manage Array field, and then press **Enter**.
- To create a new array, press **C**.



Manage Array screen

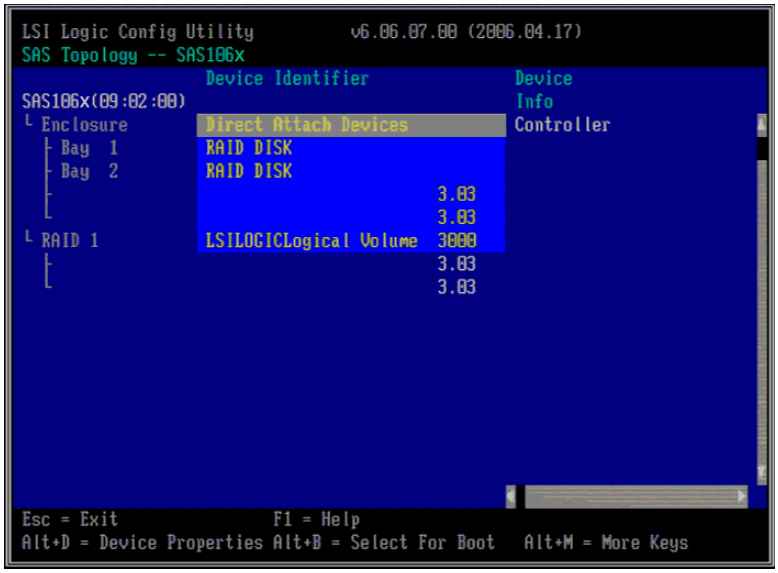
Use the Manage Array screen to modify features of the currently selected array.



- Select Synchronize Array, Activate Array, or Delete Array
  - To confirm the selection, press **Y**.
  - To cancel the process, press **N**.

SAS Topology screen

The SAS Topology screen provides basic information about each device connected to the adapter and provides the ability to identify the physical device in the system that corresponds to a device in the list. Scroll horizontally to view all the information listed for a device. To access this screen, select the SAS Topology link on the Adapter Properties screen.

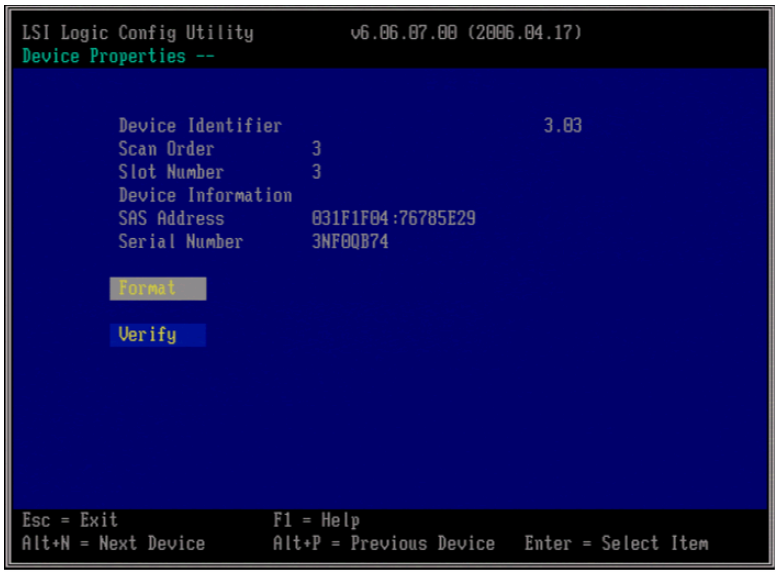


- To view detailed information about a device, move the cursor to the appropriate Device Identifier field, and then press **Alt**+**D**. The Device Properties screen is displayed.
- To identify the physical device corresponding to a listed device, move the cursor to the appropriate Device Identifier field, and then press **Enter**. The locator LED on the device is lit.
- To clear Device Mappings for missing devices, press **C** at any time while on this screen.

Device Properties screen

The Device Properties screen displays information about a specific device. To access this screen, press **Alt**+**D** when the cursor is in the Device Identifier field of a device on the SAS Topology screen.

- To move to the next device, press **Alt**+**N**.
- To move back to the previous device, press **Alt**+**P**.



This screen also provides access to the Format and Verify screens. To reach either of these screens, move the cursor to the appropriate field, and then press **Enter**.

Device Format screen

Use the Format screen to format a particular device. To access this screen, press **Enter** in the appropriate field on the Device Properties screen.

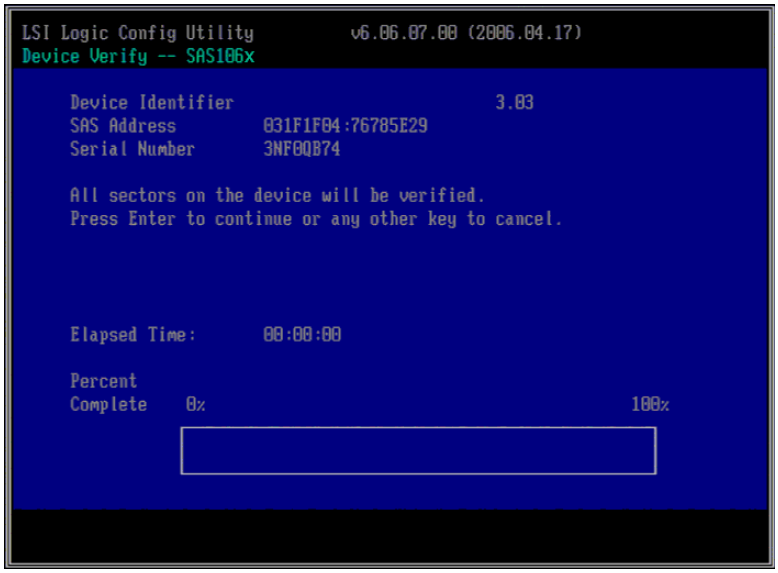
CAUTION: After a format is started it cannot be paused or cancelled.

To begin the format, press **F**.

The formatting procedure sets the sector size to 512 bytes, even if the drive was previously formatted to another sector size. This is the only sector size that the SAS BIOS configuration utility supports on RAID volumes.

Device Verify screen

Use the Device Verify screen to verify a particular device. To access this screen, press **Enter** in the appropriate field on the Device Properties screen.



Press **Enter** to begin the verify process. Press **Esc** to cancel the verify process at any time.

If the logical block addresses (LBAs) can be reassigned or must be reassigned, the following prompt appears after pressing **Enter**:

```
Reassign the block?
(Yes, No, All, nonE, Cancel)
```

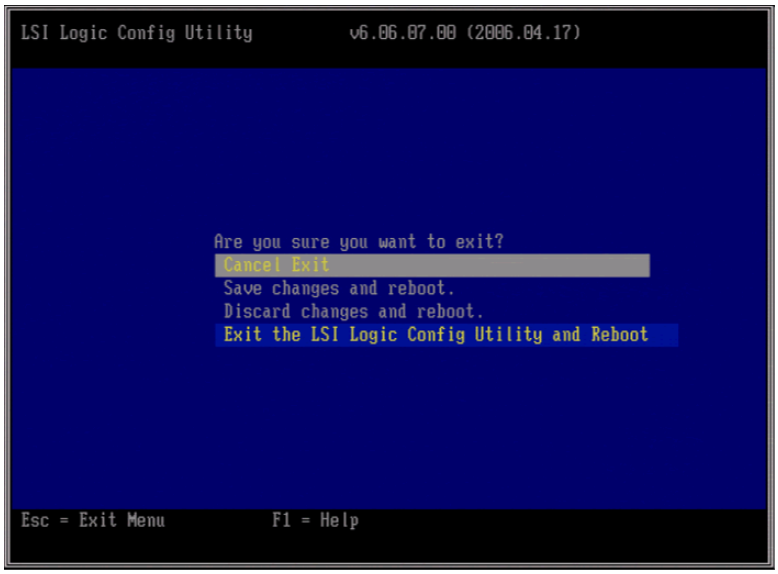
The reassignment options are as follows:

- Yes—Reassign only this block. If another block must be reassigned in the future, display the prompt again.
- No—Do not reassign this block. If another block must be reassigned in the future, display the prompt again.
- All—Reassign the current block, and automatically reassign other blocks that must be reassigned, without displaying the prompt again.
- nonE—Do not reassign the current block, and do not automatically reassign any other blocks that must be reassigned. Do not display the prompt again.
- Cancel—Do not reassign any blocks and stop the verify process.

Exit Menu screen

The SAS BIOS configuration utility must be exited properly because some changes take effect only during the exit process.

To access the Exit Menu screen, press **Esc** from any screen in the utility.



If an option is not relevant or not available, it is deactivated.

Performing configuration tasks

Creating a RAID 0 volume

In a RAID 0 volume, data is striped across multiple disk drives, combining the drives into one logical volume. This procedure maximizes storage capacity and performance.

IMPORTANT: RAID 0 does not provide any data protection if a drive fails.

When selecting drives for the RAID 0 volume, remember the following limitations:

- Every drive in the volume must be of the same type.

- Each drive must have 512-byte blocks.
- Drives with removable media are not supported.
- The volume must have at least two drives but no more than eight drives.

To create a RAID 0 volume:

1. On the Adapter List screen, select an adapter.
2. On the Adapter Properties screen, select **RAID Properties.**
   - If the adapter already has a configured volume, the View Array screen is displayed. Press **C** to create a new volume, and then continue with the next step.
   - If the adapter does not yet have a configured volume, the Select New Array Type screen is displayed. Continue with the next step.
3. On the Select New Array Type screen, select **Create RAID 0 Volume**.

   The Create New Array screen is displayed. This screen lists the drives available to create the RAID 0 volume.
4. For each drive in the volume, move the cursor to the RAID Disk column for that drive, and then press **+**, **-**, or **Space bar**.

   The No in that field changes to a Yes, and the value in the Array Size field changes to reflect the new size of the volume.
5. Press **C** after the volume is configured, and then select **Save changes**.

IMPORTANT: The volume cannot be changed after the number of drives in a RAID volume is set.

The configuration utility pauses while the array is created and then returns to the Adapter Properties screen.

6. (Optional) To set this RAID 0 volume as the boot volume, select the SAS Topology option on the Adapter Properties screen and then, on the screen that appears, set the boot volume. For more information, see "Selecting a boot disk (on page 47)."

Creating a RAID 1 volume

In a RAID 1 volume, data is mirrored from one disk drive onto another one. This procedure increases reliability by providing protection against the failure of a single drive.

When selecting drives for the RAID 1 volume, remember the following limitations:

- Every drive in the volume must be of the same type.
- Each drive must have 512-byte blocks.
- Drives with removable media are not supported.
- A RAID 1 volume must have two drives.

To create a RAID 1 volume:

1. On the Adapter List screen, select an adapter.
2. On the Adapter Properties screen, select **RAID Properties**.
   - If the adapter already has a configured volume, the View Array screen is displayed. Press **C** to create a new volume, and then continue with the next step.
   - If the adapter does not yet have a configured volume, the Select New Array Type screen is displayed. Continue with the next step.
3. On the Select New Array Type screen, select **Create RAID 1 Volume**.

   The Create New Array screen is displayed. This screen lists the drives that can be used to create the RAID 1 volume.

4. For each drive in the volume, move the cursor to the RAID Disk column for that drive, and then press **+**, **-**, or **Space bar**. The No in that field changes to Yes, and the value in the Array Size field changes to reflect the new size of the volume.

   When the first drive is added, select whether to keep existing data or overwrite existing data.

   - To keep any existing data on the first drive, press **M**.
   - To overwrite any data on the first drive, press **D**.

5. When volume configuration is finished, press **C**, and then select **Save Changes**.

   The configuration utility pauses while the array is created, and then returns to the Adapter Properties screen.

6. (Optional) To set this RAID 1 volume as the boot volume, select the SAS Topology option on the Adapter Properties screen. For more information, see "Selecting a boot disk (on page 47)."

Viewing RAID volume properties

1. On the Adapter List screen, select an adapter.
2. On the Adapter Properties screen, select **RAID Properties**. The View Array screen is displayed, showing the properties of the first volume on the adapter.
3. If the adapter has more than one volume configured, view the properties of the next array by pressing **Alt**+**N**.

Managing an array

To manage an array:

1. On the Adapter list screen, select an adapter.
2. On the Adapter Properties screen, select **RAID Properties**.
3. On the View Array screen, select **Manage Array**.
4. Choose an available option:
   - Synchronize an array
   - Activate an array
   - Delete an array

Synchronizing an array

When a RAID 1 volume is synchronized, the data on the secondary drive of the mirror is updated by copying changed data from the primary drive.

To start a synchronization, select **Synchronize Array** on the Manage Array screen, and then press **Y**. (To cancel a synchronization, press **N**.)

Activating an array

An array becomes inactive if, for example, it is removed from one controller or computer and moved to another one. The Activate Array option enables an inactive array that has been added to a system to be reactivated. This option is only available when the selected array is currently inactive.

To activate an array, select **Activate Array** on the Manage Array screen, and then press **Y**. (To cancel the activation, press **N**.)

After a pause the array becomes active.

Deleting an array

△ **CAUTION:** To avoid loss of data, back up all data before deleting the array.

To delete an array, select **Delete Array** on the Manage Array screen, and then press **Y**. (To cancel the deletion, press **N**).

When a volume has been deleted, it cannot be recovered. When a RAID 1 volume is deleted, the data is preserved on the primary disk. The master boot records of other disks in the array are deleted. For other RAID types, the master boot records of all disks are deleted.

Locating a disk drive

There are two ways to physically locate a disk drive:

- On the Create New Array screen, the drive locator LED is on when a drive is selected to be part of a RAID volume. When the RAID volume is created, or the drive is deselected from the volume, the locator LED is off.
- On the SAS Topology screen, move the cursor to the drive, and then press **Enter**. The locator LED on the drive remains lit until another key is pressed.

Selecting a boot disk

To select a boot disk:

1. On the Adapter List screen, select an adapter.
2. On the Adapter Properties screen, select **SAS Topology**. The SAS Topology screen is displayed. If selection of a boot device is supported, the **Alt**+**B** option is listed at the bottom of the screen. If a device is currently configured as the boot device, the Device Info column displays the word Boot.
   - To remove the boot disk designator, move the cursor to the current boot disk and press **Alt**+**B**. The adapter no longer has a designated boot device.
   - To select a boot disk, move the cursor to the disk, and press **Alt**+**B**. The selected disk moves to scan ID 0 on the next boot and remains at this position. There can be only one boot disk.

Server blade deployment tools

Software drivers and additional components

HP offers the following additional software components for server blades:

- Health and Wellness driver and IML viewer
- iLO Advanced Management interface driver
- Rack infrastructure interface service

For Microsoft® Windows® OS users, these items are included in the ProLiant Support Pack for Microsoft® Windows®, available from the HP website (http://h18002.www1.hp.com/support/files/server/us/index.html).

Linux OS users can download these components from the HP website (http://www.hp.com/products/servers/linux).

For information on how to use these components with a Linux OS, refer to the HP website (http://h18000.www1.hp.com/products/servers/linux/documentation.html).

ProLiant p-Class Advanced management

iLO Advanced is a standard component of ProLiant p-Class server blades that provides server health and remote server blade manageability. Its features are accessed from a network client device using a supported web browser. In addition to other features, iLO Advanced provides keyboard, mouse, and

video (text and graphics) capability for a server blade, regardless of the state of the host OS or host server blade.

iLO includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server blade and its OS. iLO provides remote access to any authorized network client, sends alerts, and provides other server blade management functions.

Using a supported web browser, you can:

- Remotely access the console of the host server blade, including all text mode and graphics mode screens with full keyboard and mouse controls.
- Remotely power up, power down, or reboot the host server blade.
- Remotely boot a host server blade to a virtual diskette image to perform a ROM upgrade or install an OS.
- Send alerts from iLO Advanced regardless of the state of the host server blade.
- Access advanced troubleshooting features provided by iLO Advanced.
- Launch a web browser, use SNMP alerting, and diagnose the server blade with HP SIM.
- Configure static IP bay settings for the dedicated iLO management NICs on each server blade in an enclosure for faster deployment.

The server blade must be properly cabled for iLO connectivity. Connect to the server blade with one of the following methods:

- Through an existing network (in the rack)—This method requires you to install the server blade in its enclosure and assign it an IP address manually or using DHCP.
- Through the server blade I/O port
  - In the rack—This method requires you to connect the local I/O cable to the I/O port and a client PC. Using the static IP address listed on the I/O cable label and the initial access information on the front of the server blade, you can access the server blade with the iLO Advanced Remote Console.
  - Out of the rack, with the diagnostic station—This method requires you to power the server blade with the optional diagnostic station and connect to an external computer using the static IP address and the local I/O cable. For cabling instructions, refer to the documentation that ships with the diagnostic station or to the Documentation CD.
  - Through the server blade rear panel connectors (out of the rack, with the diagnostic station)—This method enables you to configure a server blade out of the rack by powering the server blade with the diagnostic station and connecting to an existing network through a hub. The IP address is assigned by a DHCP server on a network.

The p-Class tab enables you to control specific settings for the HP BladeSystem. iLO also provides web-based status for the HP BladeSystem configuration.

For detailed information about iLO Advanced, refer to the *HP Integrated Lights-Out User Guide* on the HP website (http://www.hp.com/servers/lights-out).

Network-based PXE deployment

PXE is a component of the Intel® WfM specification. The PXE model enables server blades to load and execute an NBP from a PXE server and to execute a pre-configured image. The image can be an OS image created by software utilities or a boot diskette image. This feature enables a user to configure a server blade and install an OS over a network.

Deployment overview

When a PXE-enabled client boots, it obtains an IP address from a DHCP server. The client obtains the name of the NBP from the appropriate boot server. Then, the client uses TFTP to download the NBP from the boot server and executes the image.

For each server blade being deployed, the PXE server must be connected to the NIC designated for PXE. The server blade defaults PXE functions to NIC 1, but any of the two NC series NICs can be designated for PXE in RBSU. For NIC connector locations on RJ-45 patch panels and interconnect switches, refer to the documentation included with the server blade.

NOTE: Actual NIC numeration depends on several factors, including the OS installed on the server blade.

To deploy an OS to multiple server blades, install a PXE deployment server on a network.

Deployment infrastructure

To establish a network-based PXE deployment infrastructure, provide the following software and minimum hardware:

- Client PC (administrative workstation)
  - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Intel® Pentium® III or higher processor (700 MHz or greater recommended)
  - 128 MB of RAM
  - Microsoft® Windows® 2000 Professional or Microsoft® Windows® XP OS
  - Microsoft® Internet Explorer 5.5 or above with 128-bit encryption
  - Ethernet NIC with 10/100 RJ-45 connector
  - TCP/IP networking and an IP address compatible with one of the following: the iLO Diagnostic Port IP address or an assigned DHCP or static IP address
  - CD-ROM drive and/or diskette drive
  - Any of the following Java™ Runtime Environment versions:

    1.3.1_02

    1.3.1_07

    1.3.1_08

    1.4.1 for Windows® users only

    1.4.2 for Linux users only

    Access the Java™ Runtime Environment versions at the HP website (http://java.sun.com/products/archive/index.html).
- DHCP server (IP address assignment)
  - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Pentium® or Pentium® II 200-MHz or faster processor
  - 64 MB of RAM
  - 64 MB of free hard drive space
  - 10-Mb/s network adapter
- PXE deployment server (storing boot images)
  - AMD Athlon™ XP processor (700 MHz or greater recommended), AMD Athlon™ 64 processor, or Intel® Pentium® III or higher processor (500 MHz recommended)
  - 256 MB of RAM
  - 10-Mb/s network adapter
  - CD-ROM drive

- NFS repository server (only required for Red Hat Linux deployment)
  - Red Hat Linux 7.2 OS installed
  - Network connection
  - CD-ROM drive
  - NFS installed
  - 1.5 GB of available disk space
- Windows® repository server (only required for Windows® deployment)
  - Windows® 2000 or Windows® 2003 OS installed
  - Network connection
  - CD-ROM drive
  - 1.5 GB of available disk space
  - TCP/IP networking and an IP address compatible with one of the following: the iLO Diagnostic Port IP address or an assigned DHCP or static IP address
  - CD-ROM drive and/or diskette drive
  - Any of the following Java™ Runtime Environment versions:

    1.3.1_02

    1.3.1_07

    1.3.1_08

    1.4.1 for Windows® users only

    1.4.2 for Linux users only

    Access the Java™ Runtime Environment versions at the HP website (http://java.sun.com/products/archive/index.html).
- Network server with an OS installed

Deployment methods

Four primary deployment methods are supported:

IMPORTANT: To deploy a server blade without the RDP, create a bootable diskette or image of a bootable diskette.

- PXE deployment (on page 50)
- CD-ROM deployment (on page 51)
- Diskette image deployment (on page 52)
- SAN configuration (on page 53)

PXE deployment

PXE enables server blades to load an image over the network from a PXE server, and then execute it in memory. The first NIC on the server blade is the default PXE boot NIC, but any of the other NC series NICs can be configured to boot PXE. For more information, refer to "Network-based PXE deployment (on page 48)."

NOTE: Actual NIC numeration depends on several factors, including the OS installed on the server blade.

HP recommends using one of the following methods for PXE deployment:

- HP ProLiant Essentials RDP ("HP ProLiant Essentials Rapid Deployment Pack" on page 51)
- SmartStart Scripting Toolkit (on page 51)

A number of third-party PXE deployment tools are available for Windows® and Linux. For additional information, refer to the HP website (ftp://ftp.compaq.com/pub/products/servers/management/pxe_wp.pdf).

HP ProLiant Essentials Rapid Deployment Pack

NOTE: To deploy server blades in an existing server blade enclosure, always use the most recent version of RDP available at the HP website (http://www.hp.com/servers/rdp).

The RDP software is the preferred method for rapid, high-volume server deployments. The RDP software integrates two powerful products: Altiris Deployment Solution and the HP ProLiant Integration Module.

The intuitive graphical user interface of the Altiris Deployment Solution console provides simplified point-and-click and drag-and-drop operations that enable you to deploy target servers, including server blades, remotely. It enables you to perform imaging or scripting functions and maintain software images.

For more information about the RDP, refer to the HP ProLiant Essentials Rapid Deployment Pack CD or refer to the HP website (http://www.hp.com/servers/rdp).

SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit is designed to support ProLiant BL, ML, and DL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these new tools to build an automated server deployment process.

Using SmartStart technology, the Scripting Toolkit provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each server deployed, making it possible to scale server deployments to high volumes in a rapid manner.

For more information, and to download the SmartStart Scripting Toolkit, refer to the HP website (http://www.hp.com/servers/sstoolkit).

CD-ROM deployment

CD-ROM deployment involves using a bootable CD that executes script to configure the hardware and install the OS. After the OS is configured, the server blade can access the network to locate the scripts and files necessary for deployment.

Before beginning the deployment process, connect the server blade to the network with one of the following methods:

- Through an existing network (in the rack)—For this method, install the server blade in its enclosure and assign it an IP address (manually or with DHCP).
- Through an existing network (out of the rack, with the diagnostic station)—For this method, power the server blade with the diagnostic station and connect to an existing network through a hub. The DHCP server on the network assigns the IP address.

Other methods for connecting to the server blade are available, but they do not provide the required network access for deployment. For more information, refer to "ProLiant p-Class Advanced management (on page 47)."

NOTE: For more information about hardware and cabling configurations, refer to the documents that ship with the server blade enclosure or diagnostic station.

Two methods are available for CD-ROM deployment:

- iLO virtual CD-ROM (on page 52)
- USB CD-ROM (on page 52)

iLO virtual CD-ROM

To deploy with a boot CD:

1. Do one of the following:
   - Insert the boot CD into the client PC that is using the iLO Remote Console.
   - Use iLO to create an image file of the boot CD.
   - Copy the image of the boot CD to a location on the network or the client PC hard drive.
2. Remotely access the server blade through iLO. Refer to "ProLiant p-Class Advanced management (on page 47)."
3. Click the **Virtual Devices** tab.
4. Select **Virtual Media**.
5. Use the Virtual Media applet to select the local CD or image file and connect the Virtual CD to the server blade.
6. Use the iLO Virtual Power Button feature to reboot the server blade.
7. After the server blade boots, follow the normal network installation procedure for the OS.

USB CD-ROM

NOTE: When installing the operating system from a USB CD-ROM drive, the Microsoft® Windows® 2003 OS does not automatically create the required boot partition. Create a partition on the hard drive and manually install the OS, or use the most current versions of SmartStart or RDP to install the OS.

This method uses SmartStart to facilitate loading the OS. However, SmartStart also allows for manual loading of the OS and drivers.

To deploy with a boot CD:

1. Use the local I/O cable to connect a USB CD-ROM drive to the server blade. Refer to "Connecting locally to a server blade with video and USB devices (on page 33)."
2. Insert the boot CD into the USB CD-ROM drive.
3. Reboot the server blade.
4. After the server blade boots, follow the normal installation procedure for an OS.

Diskette image deployment

To deploy with a diskette image, the user creates a DOS-based network-enabled boot diskette that executes a script that configures the hardware and installs the OS. The diskette enables the server blade to access the required deployment scripts and files on the network.

This method implies a deployment infrastructure that may include an administrator workstation, PXE server, Microsoft® Windows® file share, or a Linux file share. For more information, refer to "Deployment infrastructure (on page 49)."

Before beginning the deployment process, connect the server blade to the network with one of the following methods:

- Through an existing network (in the rack)—For this method, install the server blade in its enclosure and assign it an IP address (manually or with DHCP).
- Through an existing network (out of the rack, with the diagnostic station)—For this method, power the server blade with the diagnostic station and connect to an existing network through a hub. The DHCP server on the network assigns the IP address.

Other methods for connecting to the server blade are available, but they do not provide the required network access for deployment. For more information, refer to "ProLiant p-Class Advanced management (on page 47)."

NOTE: For more information about hardware and cabling configurations, refer to the documents that ship with the server blade enclosure or diagnostic station.

Two methods are available for diskette image deployment:

- iLO virtual floppy (on page 53)
- PXE ("PXE deployment" on page 50)

iLO virtual floppy

To deploy with a boot diskette:

1. Do one of the following:
   - Insert the boot diskette into the client PC that is using the iLO Remote Console.
   - Use iLO to create an image file of the boot diskette.
   - Copy the image of the boot diskette to a location on the network or the client PC hard drive.
2. Remotely access the server blade through iLO. Refer to "ProLiant p-Class Advanced management (on page 47)."
3. Click the **Virtual Devices** tab.
4. Select **Virtual Media**.
5. Use the Virtual Media applet to select the local diskette or image file and connect the Virtual CD to the server blade.
6. Use the iLO Virtual Power Button feature to reboot the server blade.
7. After the server blade boots, follow the normal network installation procedure for the OS.

Creating a boot diskette

The SmartStart Scripting Toolkit provides the tools and information for creating a boot diskette. For details, refer to the *SmartStart Scripting Toolkit User Guide* and download the latest version of the software from the HP website (http://www.hp.com/servers/sstoolkit).

As an alternative method, configure the hardware manually with RBSU and the iLO remote console. With this method, the disk is more generic and integrates with an existing network OS installation process. For more information, refer to "ProLiant p-Class Advanced management (on page 47)."

To operate properly, the server blade must have a supported OS. For the latest information on a supported OS, refer to the HP website (http://www.hp.com/go/supportos).

SAN configuration

The server blade provides FC support for SAN implementations. This solution uses an optional FCA that offers redundant SAN connectivity and optimization for HP StorageWorks products. The server blade is also compatible with certain third-party SAN products. For more information, refer to the documentation that ships with the FCA option.

For optimal SAN connectivity, observe the following guidelines:

- The FCA option is installed correctly in the server blade. Refer to the documentation that ships with the FCA option.
- An FC-compatible interconnect is installed in the enclosure. Refer to the documentation that ships with the interconnect option.
- The server blade enclosure management module firmware is up-to-date. Refer to the HP Business Support Center website (http://www.hp.com/support).
- The server blade is cabled properly to a supported SAN.

- SAN storage drivers are loaded. Refer to supporting white papers and the HP website (http://www.hp.com/servers/rdp).

For SAN configuration information for the server blade, refer to the *HP StorageWorks SAN Design Reference Guide* on the HP website (http://h18000.www1.hp.com/products/storageworks/san/documentation.html).

Configuration tools

SmartStart Software

NOTE: To deploy server blades in an existing server blade enclosure, always use the most recent version of SmartStart available at the HP website (http://www.hp.com/servers/smartstart).

SmartStart is a collection of software that optimizes single-server setup, providing a simple and consistent way to deploy server configuration. SmartStart has been tested on many ProLiant server products, resulting in proven, reliable configurations.

SmartStart assists the deployment process by performing a wide range of configuration activities, including:

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA
- Preparing the system for installing "off-the-shelf" versions of leading operating system software
- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation
- Testing server hardware using the Insight Diagnostics Utility ("HP Insight Diagnostics" on page 58)
- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.
- Enabling access to the Array Configuration Utility, Array Diagnostic Utility, and Erase Utility (on page 56)

SmartStart is included in the HP ProLiant Essentials Foundation Pack. For more information about SmartStart software, refer to the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/smartstart).

HP ROM-Based Setup Utility

RBSU, an embedded configuration utility, performs a wide range of configuration activities that may include:

- Configuring system devices and installed options
- Displaying system information
- Selecting the primary boot controller
- Configuring memory options
- Language selection

For more information on RBSU, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Using RBSU

The first time you power up the server blade, the system prompts you to enter RBSU and select a language. Default configuration settings are made at this time and can be changed later. Most of the features in RBSU are not required to set up the server blade.

To navigate RBSU, use the following keys:

- To access RBSU, press the **F9** key during power up when prompted in the upper right corner of the screen.
- To navigate the menu system, use the arrow keys.
- To make selections, press the **Enter** key.

IMPORTANT: RBSU automatically saves settings when you press the **Enter** key. The utility does not prompt you for confirmation of settings before you exit the utility. To change a selected setting, you must select a different setting and press the **Enter** key.

Boot options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the POST sequence runs, and then the boot option screen is displayed. This screen is visible for several seconds before the system attempts to boot from a diskette, CD, or hard drive. During this time, the menu on the screen allows you to install an operating system or make changes to the server configuration in RBSU.

BIOS Serial Console

BIOS Serial Console allows you to configure the serial port to view POST error messages and run RBSU remotely through a serial connection to the server COM port. The server that you are remotely configuring does not require a keyboard and mouse.

For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide* on the Documentation CD or the HP website (http://www.hp.com/servers/smartstart).

Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the server serial number and the product ID.

1. During the server startup sequence, press the **F9** key to access RBSU.
2. Select the **System Options** menu.
3. Select **Serial Number**. The following warning is displayed:

   ```
   WARNING! WARNING! WARNING! The serial number is loaded into the system
   during the manufacturing process and should NOT be modified. This option
   should only be used by qualified service personnel. This value should
   always match the serial number sticker located on the chassis.
   ```

4. Press the **Enter** key to clear the warning.
5. Enter the serial number and press the **Enter** key.
6. Select **Product ID**.
7. Enter the product ID and press the **Enter** key.
8. Press the **Esc** key to close the menu.
9. Press the **Esc** key to exit RBSU.
10. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

Management tools

Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the HP SIM console or through RBSU.

ROMPaq Utility

NOTE: For ROMPaq procedures, use a diskette or USB drive key, when applicable.

Flash ROM enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive and boot the system.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available ROM revisions. This procedure is the same for both system and option ROMPaq utilities.

For more information about the ROMPaq utility, refer to the HP website (http://www.hp.com/servers/manage).

Integrated Lights-Out Manager technology

The iLO subsystem is a standard component of selected ProLiant servers that provides server health and remote server manageability. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system. The iLO subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO, you can:

- Remotely power up, power down, or reboot the host server.
- Send alerts from iLO regardless of the state of the host server.
- Access advanced troubleshooting features through the iLO interface.
- Diagnose iLO using HP SIM through a web browser and SNMP alerting.

For more information about iLO features, refer to the iLO documentation on the Documentation CD or on the HP website (http://www.hp.com/servers/lights-out).

Erase Utility

CAUTION: Perform a backup before running the System Erase Utility. The utility sets the system to its original factory state, deletes the current hardware configuration information, including array setup and disk partitioning, and erases all connected hard drives completely. Refer to the instructions for using this utility.

Run the Erase Utility if you need to erase the system for the following reasons:

- You want to install a new operating system on a server with an existing operating system.
- You want to change the operating system selection.

- You encounter a failure-causing error during the SmartStart installation.
- You encounter an error when completing the steps of a factory-installed operating system installation.

The Erase Utility can be accessed from the Software and Drivers Download website (http://www.hp.com/go/support) or the **Maintenance Utilities** menu of the SmartStart CD.

HP Systems Insight Manager

HP SIM is a web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a web browser. HP SIM provides device management capabilities that consolidate and integrate management data from HP and third-party devices.

IMPORTANT: You must install and use HP SIM to benefit from the Pre-Failure Warranty for processors, SAS and SCSI hard drives, and memory modules.

For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP SIM website (http://www.hp.com/go/hpsim).

Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP SIM software, and third-party SNMP management platforms. Management Agents are installed with every SmartStart assisted installation or can be installed through the HP PSP. The Systems Management homepage provides status and direct access to in-depth subsystem information by accessing data reported through the Management Agents. For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP website (http://www.hp.com/servers/manage).

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 4-MB ROM that acts as two, separate 2-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

NOTE: The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

USB support

HP provides both standard USB support and legacy USB support. Standard support is provided by the OS through the appropriate USB device drivers. Before the OS loads, HP provides support for USB devices through legacy USB support, which is enabled by default in the system ROM. HP hardware supports USB version 1.1 or 2.0, depending on the version of the hardware.

Legacy USB support provides USB functionality in environments where USB support is normally not available. Specifically, HP provides legacy USB functionality for:

- POST
- RBSU

- Diagnostics
- DOS
- Operating environments which do not provide native USB support

For more information on ProLiant USB support, refer to the HP website (http://h18004.www1.hp.com/products/servers/platforms/usb-support.html).

Diagnostic tools

HP Insight Diagnostics

HP Insight Diagnostics is a proactive server blade management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server blade installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, launch the SmartStart CD.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server blade management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, refer to the HP website (http://www.hp.com/servers/diags).

Survey Utility

Survey Utility, a feature within HP Insight Diagnostics (on page 58), gathers critical hardware and software information on ProLiant server blades.

This utility supports operating systems that may not be supported by the server blade. For operating systems supported by the server blade, refer to the HP website (http://www.hp.com/go/supportos).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP ("ProLiant Support Packs" on page 60).

NOTE: The current version of SmartStart provides the memory spare part numbers for the server blade. To download the latest version, see the HP website (http://www.hp.com/go/ssdownloads).

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM ("HP Systems Insight Manager" on page 57)
- From within Survey Utility (on page 58)
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application

- From within the iLO user interface
- From within HP Insight Diagnostics (on page 58)

For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

Remote support and analysis tools

HP Instant Support Enterprise Edition

ISEE is a proactive remote monitoring and diagnostic tool to help manage your systems and devices, a feature of HP support. ISEE provides continuous hardware event monitoring and automated notification to identify and prevent potential critical problems. Through remote diagnostic scripts and vital system configuration information collected about your systems, ISEE enables fast restoration of your systems. Install ISEE on your systems to help mitigate risk and prevent potential critical problems.

For more information on ISEE, refer to the HP website (http://www.hp.com/hps/hardware/hw_enterprise.html).

To download HP ISEE, visit the HP website (http://www.hp.com/hps/hardware/hw_downloads.html).

For installation information, refer to the HP ISEE Client Installation and Upgrade Guide (ftp://ftp.hp.com/pub/services/hardware/info/isee_client.pdf).

Web-Based Enterprise Service

WEBES enables administrators to manage hardware events proactively, either locally or online. The service provides real-time multiple event analysis, crash analysis, and notification, locally through SMTP and remotely through ISEE for OpenVMS, Tru64, and Microsoft® Windows® operating system binary error logs.

For more information, refer to the HP website (http://h18000.www1.hp.com/support/svctools/).

Open Services Event Manager

OSEM is a standalone tool that performs real-time reactive and proactive service event filtering, analysis, and notification. The tool gathers event data from SNMP traps or information provided over an HTTP interface and notifies an administrator or HP through SMTP and ISEE.

For more information, refer to the HP website (http://h18000.www1.hp.com/support/svctools/).

Keeping the system current

Drivers

The server blade includes new hardware that may not have driver support on all OS installation media.

If you are installing a SmartStart-supported OS, use the SmartStart software and its Assisted Path feature to install the OS and latest driver support.

NOTE: If you are installing drivers from the SmartStart CD or the Software Maintenance CD, refer to the SmartStart website (http://www.hp.com/servers/smartstart) to be sure that you are using the latest version of SmartStart. For more information, refer to the documentation provided with the SmartStart CD.

If you do not use the SmartStart CD to install an OS, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from the HP website (http://www.hp.com/support).

IMPORTANT: Always perform a backup before installing or updating device drivers.

Resource Paqs

Resource Paqs are operating system-specific packages of tools, utilities, and information for HP servers running certain Microsoft® or Novell operating systems. The Resource Paqs include utilities to monitor performance, software drivers, customer support information, and white papers on the latest server integration information. Refer to the Enterprise Partnerships website (http://h18000.www1.hp.com/partners), select **Microsoft** or **Novell**, depending on the operating system, and follow the link to the appropriate Resource Paq.

ProLiant Support Packs

PSPs represent operating system-specific bundles of ProLiant optimized drivers, utilities, and management agents. Refer to the PSP website (http://h18000.www1.hp.com/products/servers/management/psp.html).

Operating System Version Support

For information about specific versions of a supported operating system, refer to the operating system support matrix (http://www.hp.com/go/supportos).

System online ROM flash component utility

The Online ROM Flash Component Utility enables system administrators to efficiently upgrade system or controller ROM images across a wide range of servers and array controllers. This tool has the following features:

- Works offline and online
- Supports Microsoft®, Windows® 2000, Windows Server™ 2003, Novell Netware, and Linux operating systems

IMPORTANT: This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (http://www.hp.com/go/supportos).

- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

To download the tool and for more information, refer to the HP website (http://h18000.www1.hp.com/support/files/index.html).

Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (http://h18023.www1.hp.com/solutions/pcsolutions/pcn.html).

Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Refer to the Care Pack website (http://www.hp.com/hps/carepack/servers/cp_proliant.html).

Troubleshooting

In this section

Troubleshooting resources

NOTE: For common troubleshooting procedures, the term "server" is used to mean servers and server blades.

The *HP ProLiant Servers Troubleshooting Guide* provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the *HP ProLiant Servers Troubleshooting Guide:*

- The server-specific Documentation CD
- The Business Support Center on the HP website (http://www.hp.com/support). Navigate to the server technical support page. Under self-help resources, select **ProLiant Troubleshooting Guide**.
- The Technical Documentation website (http://www.docs.hp.com). Select **Enterprise Servers, Workstations and Systems Hardware,** and then the appropriate server.

Server diagnostic steps

This section covers the steps to take in order to diagnose a problem quickly.

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 66)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 67)." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

IMPORTANT: This guide provides information for multiple servers. Some information may not apply to the server you are troubleshooting. Refer to the server documentation for information on procedures, hardware options, software tools, and operating systems supported by the server.

⚠ **WARNING: To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.**

Important safety information

Familiarize yourself with the safety information in the following sections before troubleshooting the server.

Important safety information

Before servicing this product, read the *Important Safety Information* document provided with the server.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

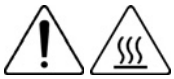
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

9.43 kg

20.8 lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Warnings and cautions

⚠ **WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.**

⚠ **WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:**

- **The leveling feet are extended to the floor.**
- **The full weight of the rack rests on the leveling feet.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together in multiple-rack installations.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

⚠ **WARNING: To reduce the risk of electric shock or damage to the equipment:**

- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**
- **Unplug the power cord from the power supply to disconnect power to the equipment.**
- **Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

9.43 kg

20.8 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- Observe local occupation health and safety requirements and guidelines for manual handling.
- Obtain adequate assistance to lift and stabilize the chassis during installation or removal.
- The server is unstable when not fastened to the rails.
- When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.

⚠ **CAUTION:** To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

⚠ **CAUTION:** The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Prepare the server for diagnosis

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. Refer to the server documentation for required environmental conditions.
2. Record any error messages displayed by the system.
3. Remove all diskettes and CDs from the media drives.

4. Power down the server and peripheral devices if you will be diagnosing the server offline. Always perform an orderly shutdown, if possible. This means you must:
   a. Exit any applications.
   b. Exit the operating system.
   c. Power down the server ("Power down the server blade" on page 12).
5. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server). Do not disconnect the printer if you want to use it to print error messages.
6. Collect all tools and utilities, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities, necessary to troubleshoot the problem.
   - You must have the appropriate Health Drivers and Management Agents installed on the server.

NOTE: To verify the server configuration, connect to the System Management homepage and select **Version Control Agent**. The VCA gives you a list of names and versions of all installed HP drivers, Management Agents, and utilities, and whether they are up to date.

- HP recommends you have access to the server documentation for server-specific information.
- HP recommends you have access to the SmartStart CD for value-added software and drivers required during the troubleshooting process.

NOTE: Download the current version of SmartStart from the HP website (http://www.hp.com/servers/smartstart).

Symptom information

Before troubleshooting a server problem, collect the following information:

- What events preceded the failure? After which steps does the problem occur?
- What has been changed since the time the server was working?
- Did you recently add or remove hardware or software? If so, did you remember to change the appropriate settings in the server setup utility, if necessary?
- How long has the server exhibited problem symptoms?
- If the problem occurs randomly, what is the duration or frequency?

To answer these questions, the following information may be useful:

- Run HP Insight Diagnostics (on page 58) and use the survey page to view the current configuration or to compare it to previous configurations.
- Refer to your hardware and software records for information.
- Refer to server LEDs and their statuses.

Service notifications

To view the latest service notifications, refer to the HP website (http://www.hp.com/go/bizsupport). Select the appropriate server model, and then click the **Troubleshoot a Problem** link on the product page.

Loose connections

Action:

- Be sure all power cords are securely connected.

- Be sure all cables are properly aligned and securely connected for all external and internal components.
- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.
- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.
- Be sure each device is properly seated.
- If a device has latches, be sure they are completely closed and locked.
- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.
- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

Diagnostic steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 66)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page 67)." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

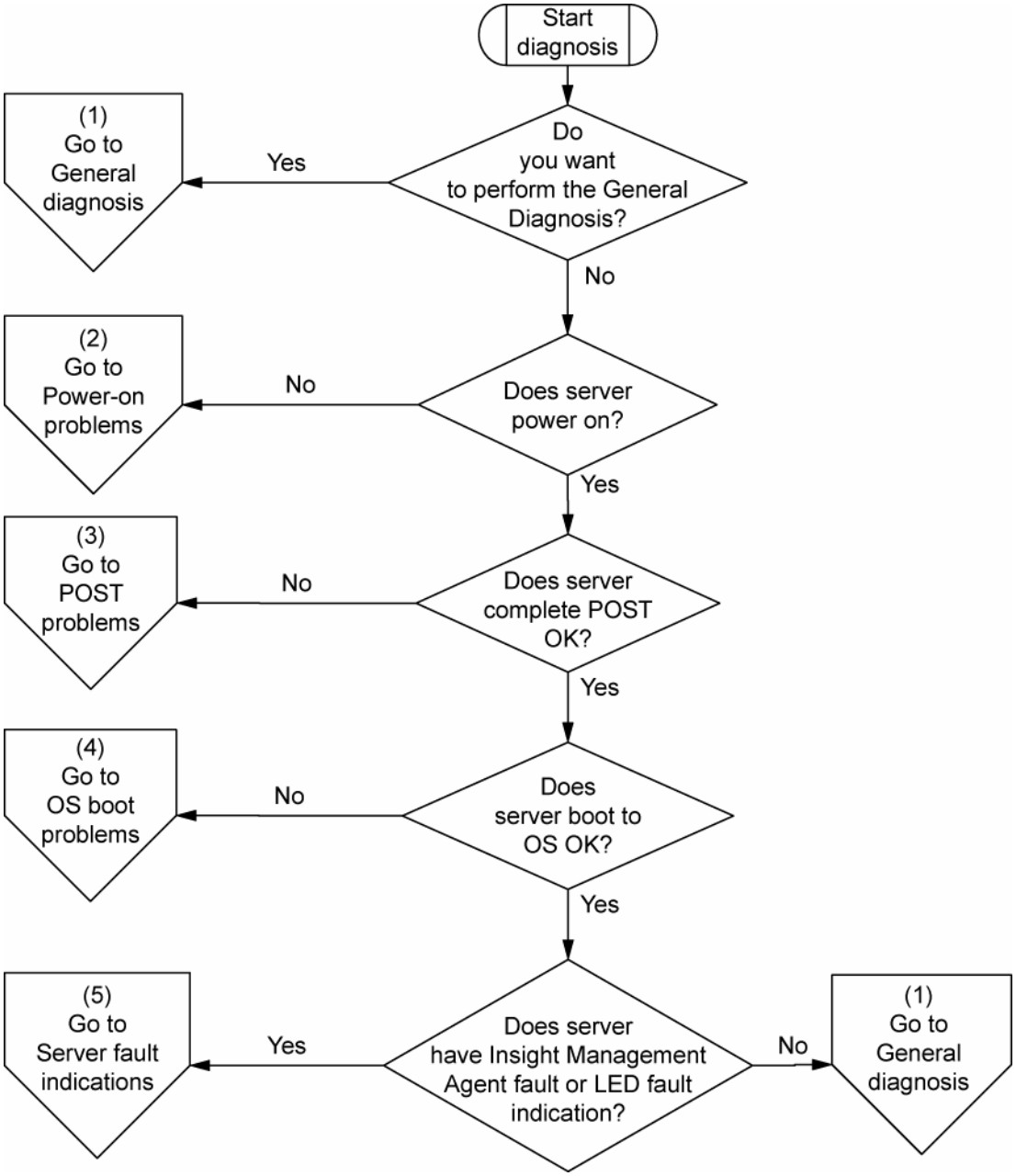
- Start diagnosis flowchart (on page 66)
- General diagnosis flowchart (on page 67)
- Power-on problems flowchart ("Server blade power-on problems flowchart" on page 69)
- POST problems flowchart (on page 71)
- OS boot problems flowchart (on page 73)
- Server fault indications flowchart (on page 75)

The number contained in parentheses in the flowchart boxes corresponds to a table with references to other detailed documents or troubleshooting instructions.

Start diagnosis flowchart

Use the following flowchart to start the diagnostic process.

Item	Refer to
1	"General diagnosis flowchart (on page 67)"
2	"Power-on problems flowchart ("Server blade power-on problems flowchart" on page 69)"
3	"POST problems flowchart (on page 71)"
4	"OS boot problems flowchart (on page 73)"
5	"Server fault indications flowchart (on page 75)"

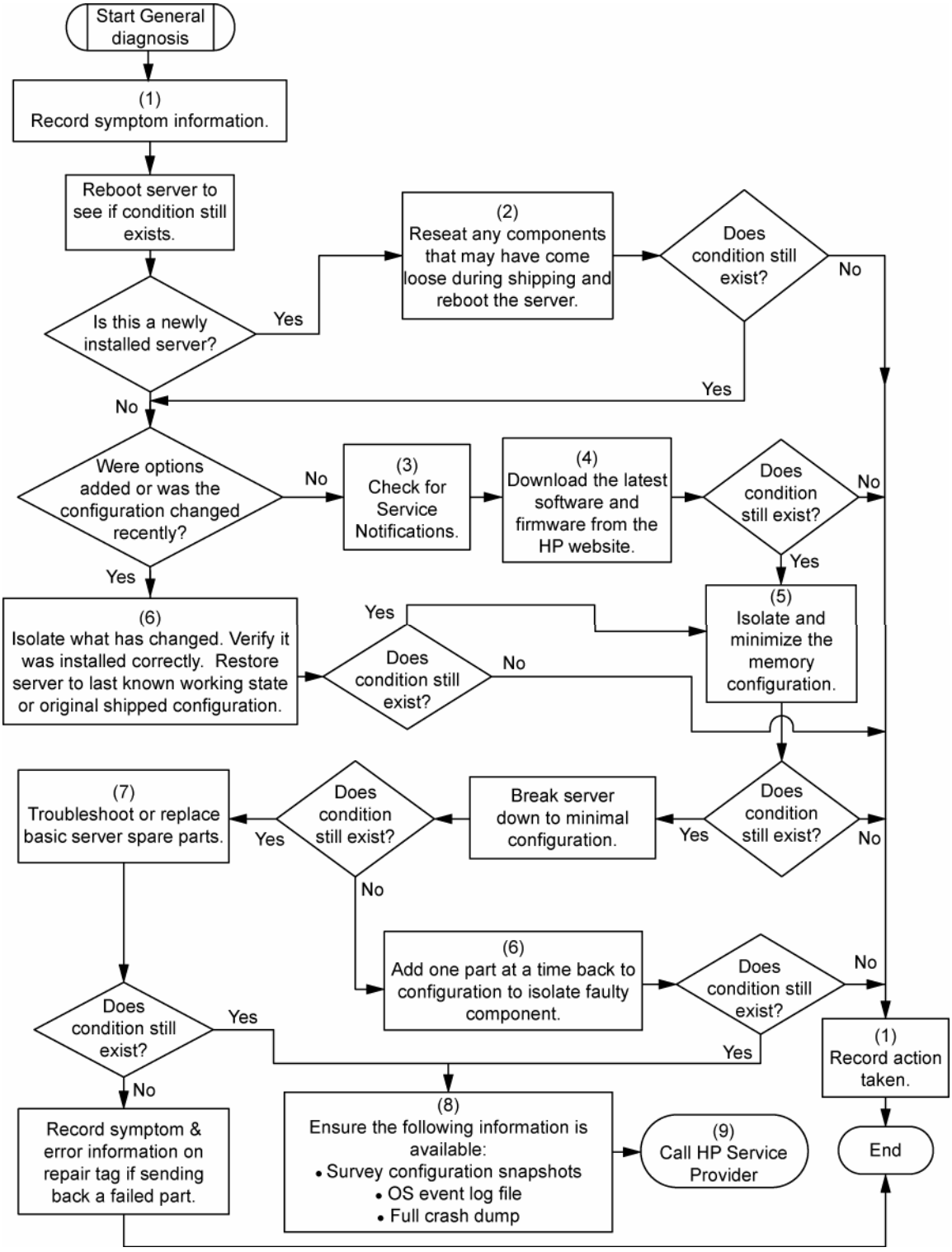


General diagnosis flowchart

The General diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the problem, or if the other flowcharts do not fix the problem, use the following flowchart.

Item	See
1	"Symptom information (on page 65)"
2	"Loose connections (on page 65)"
3	"Service notifications (on page 65)"

Item	See
4	The most recent version of a particular server or option firmware is available on the following websites: • HP Support website (http://www.hp.com/support) • HP ROM-BIOS/Firmware Updates website (http://h18023.www1.hp.com/support/files/server/us/romflash.html)
5	"General memory problems are occurring" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
6	• Maintenance and service guides for p-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info) • Maintenance and service guides for c-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/go/bladesystem/documentation)
7	• Maintenance and service guides for p-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info) • Maintenance and service guides for c-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/go/bladesystem/documentation) • "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
8	• "Server information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • "Operating system information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
9	"HP contact information (on page 87)"



Server blade power-on problems flowchart

Symptoms:

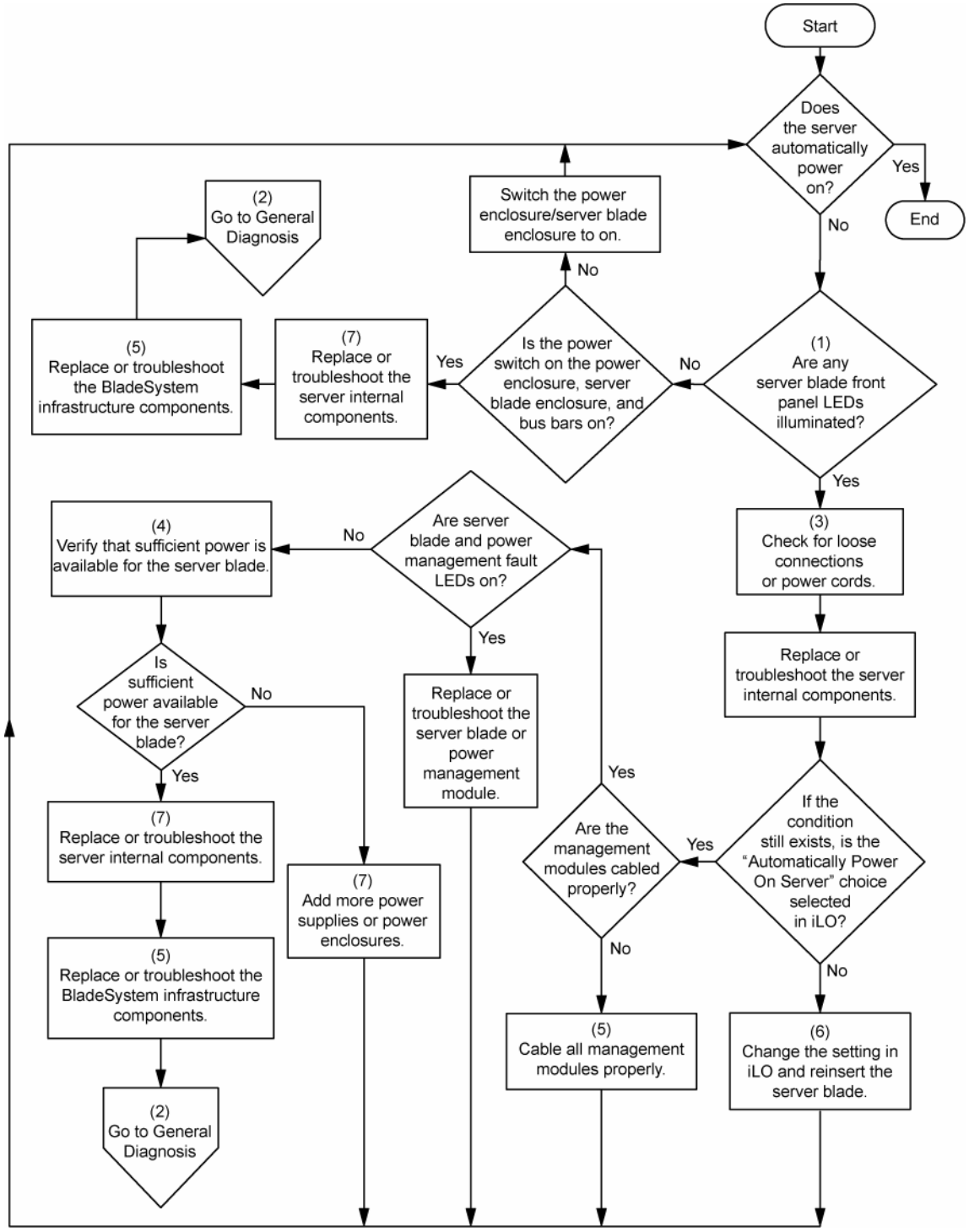
- The server does not power on.
- The system power LED is off or amber.
- The health LED is red or amber.

NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty power supply
- Loose or faulty power cord
- Power source problem
- Power on circuit problem
- Improperly seated component or interlock problem
- Faulty internal component

Item	Refer to
1	"Component identification (on page 6)"
2	"General diagnosis flowchart (on page 67)"
3	"Loose connections (on page 65)"
4	Power Calculator on the HP website (http://www.hp.com/go/bladesystem/powercalculator)
5	*HP BladeSystem Maintenance and Service Guide* located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
6	*Integrated Lights-Out User Guide* located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
7	Server maintenance and service guide located on the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)



POST problems flowchart

Symptoms:

- Server does not complete POST

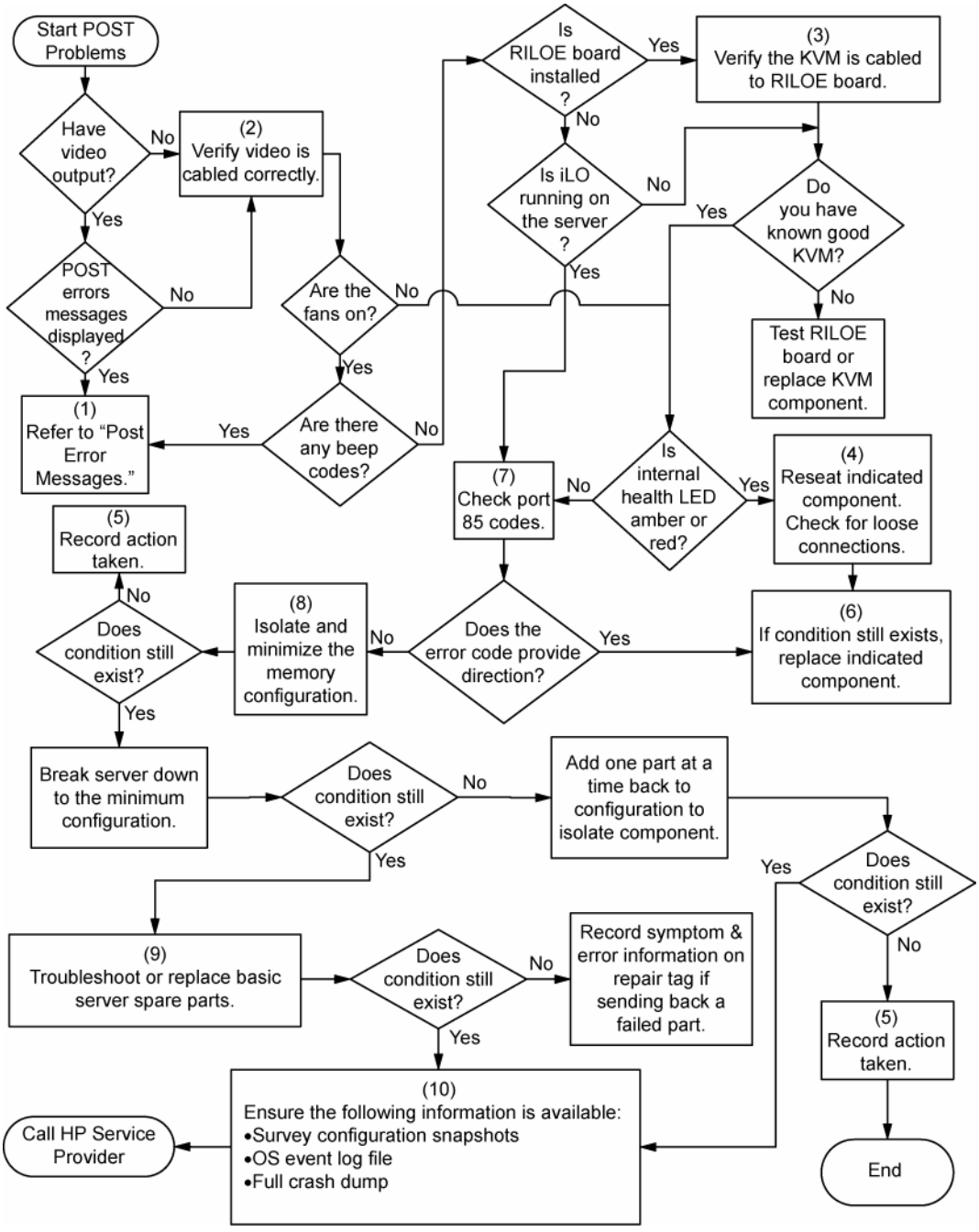
NOTE: The server has completed POST when the system attempts to access the boot device.

- Server completes POST with errors

Possible problems:

- Improperly seated or faulty internal component
- Faulty KVM device
- Faulty video device

Item	Refer to
1	"POST error messages and beep codes (on page 77)"
2	"Video problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
3	KVM or iLO documentation
4	"Loose connections (on page 65)"
5	"Symptom information (on page 65)"
6	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
7	"Port 85 and iLO messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
8	"General memory problems are occurring" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
9	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)
10	• "Server information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • "Operating system information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)



OS boot problems flowchart

There are two ways to use SmartStart when diagnosing OS boot problems on a server blade:

- Use iLO to remotely attach virtual devices to mount the SmartStart CD onto the server blade.
- Use a local I/O cable and drive to connect to the server blade, and then restart the server blade.

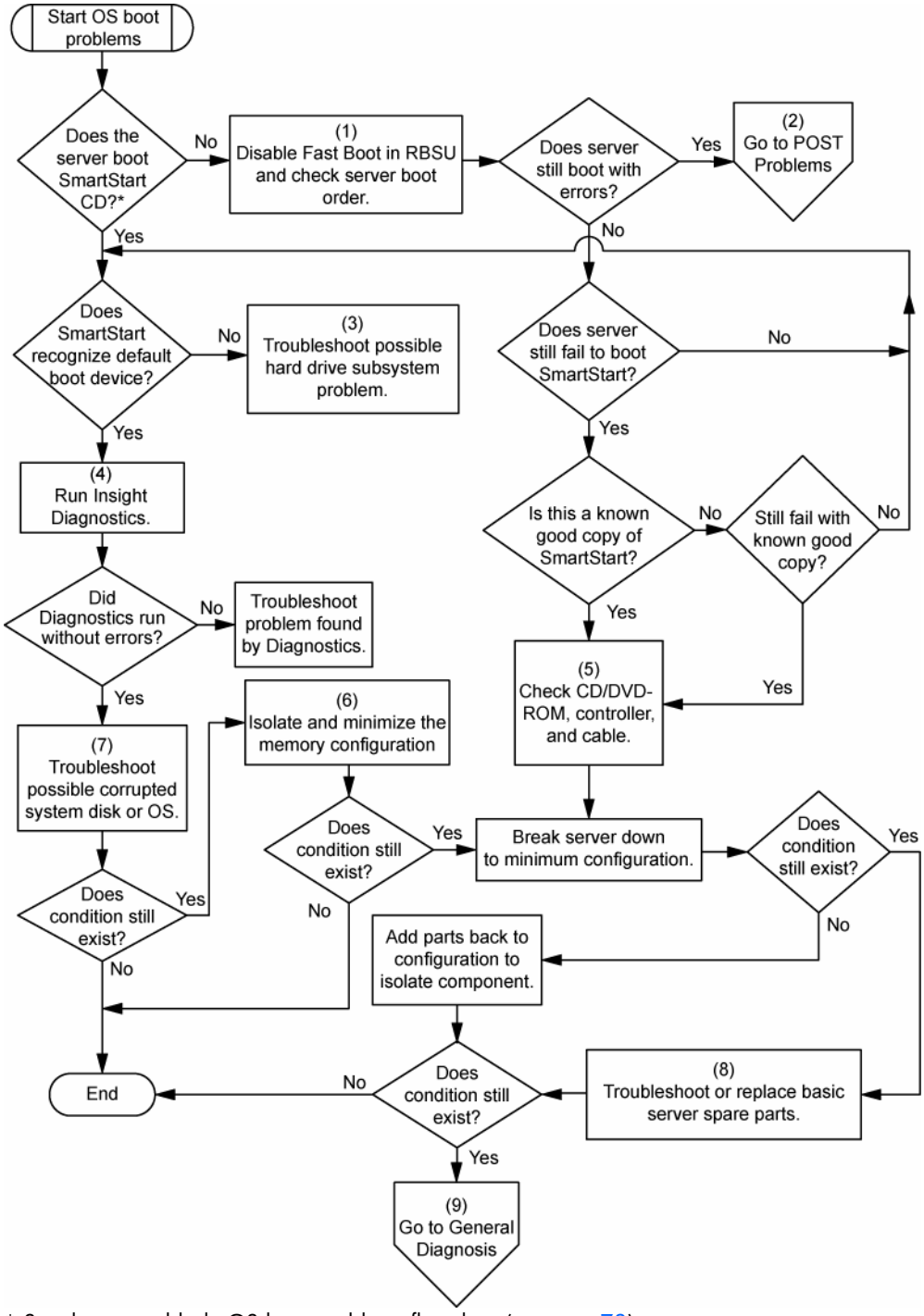
Symptoms:

- Server does not boot a previously installed OS
- Server does not boot SmartStart

Possible causes:

- Corrupted OS
- Hard drive subsystem problem
- Incorrect boot order setting in RBSU

Item	See
1	*HP ROM-Based Setup Utility User Guide* (http://www.hp.com/servers/smartstart)
2	"POST problems flowchart (on page 71)"
3	• "Hard drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Controller documentation
4	"HP Insight Diagnostics (on page 58)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
5	• "Loose connections (on page 65)" • "CD-ROM and DVD drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Controller documentation
6	"General memory problems are occurring" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
7	• "Operating system problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • "HP contact information (on page 87)"
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Maintenance and service guides for p-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info) • Maintenance and service guides for c-Class server blades, located on the Documentation CD or the HP website (http://www.hp.com/go/bladesystem/documentation)
9	"General diagnosis flowchart (on page 67)"



* See the server blade OS boot problems flowchart (on page 73)

Server fault indications flowchart

Symptoms:

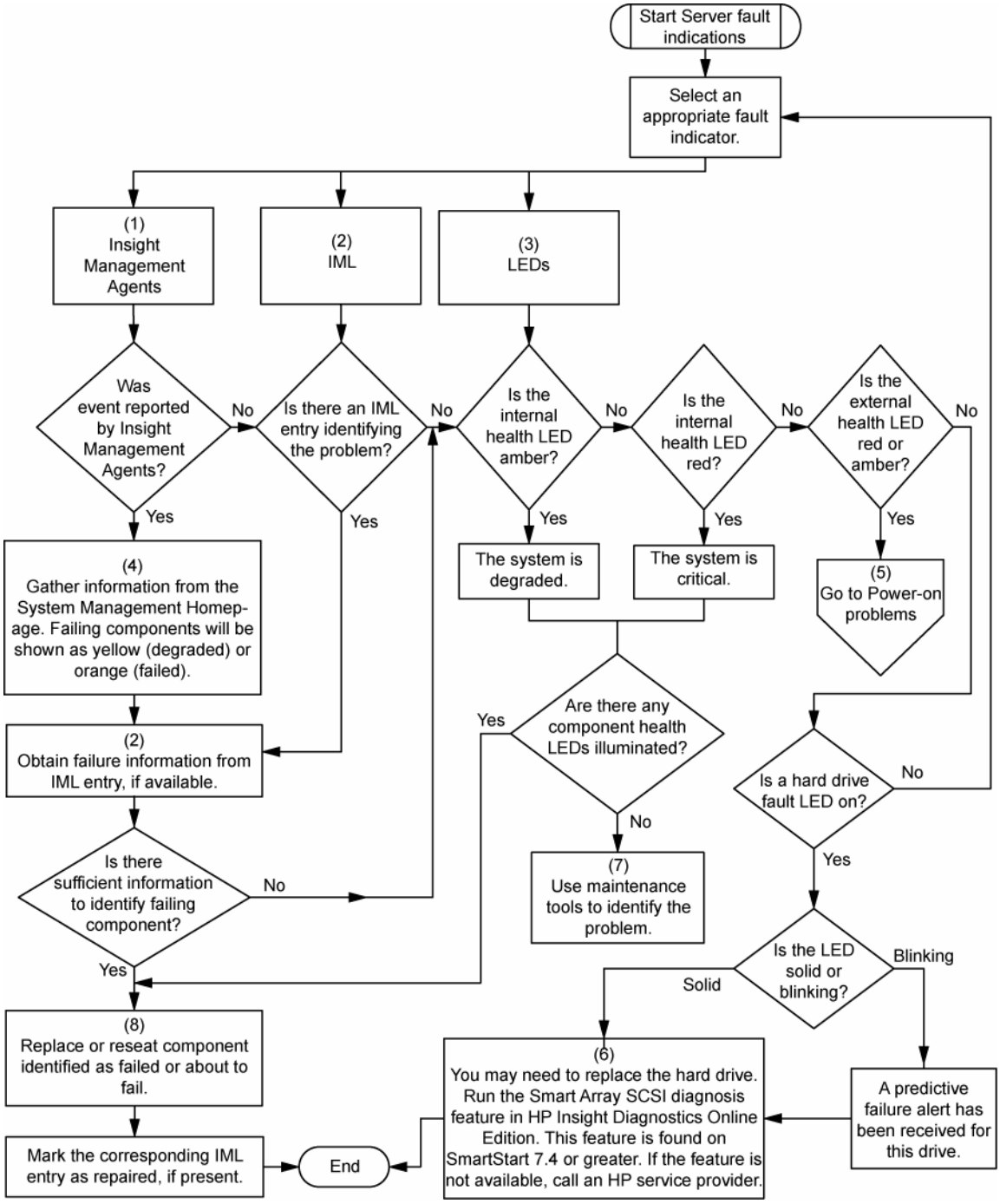
- Server boots, but a fault event is reported by Insight Management Agents (on page 57)
- Server boots, but the internal health LED, external health LED, or component health LED is red or amber

NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System overtemperature condition

Item	Refer to
1	"Management agents (on page 57)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
2	• "Integrated Management Log" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • "Event list error messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
3	"Component identification (on page 6)"
4	System Management Homepage (https://localhost:2381)
5	"Power-on problems flowchart ("Server blade power-on problems flowchart" on page 69)"
6	• "Smart Array SCSI Diagnosis feature" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info) • "HP contact information (on page 87)"
7	"HP Insight Diagnostics (on page 58)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support)
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support) • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/proliant-bl/p-class/info)



POST error messages and beep codes

Introduction

For a complete listing of error messages, refer to the "POST error messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

⚠ **WARNING: To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.**

Regulatory compliance notices

In this section

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000
- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 510101
  Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian notice (Avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

CE

This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).

CE(xxxx*)!

This marking is valid for EU non-harmonized Telecom products.

*Notified body number (used only if applicable—refer to the product label)

Disposal of waste equipment by users in private households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

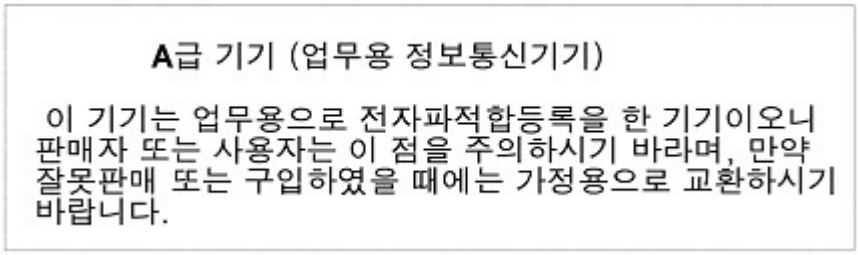
BSMI notice

警告使用者:

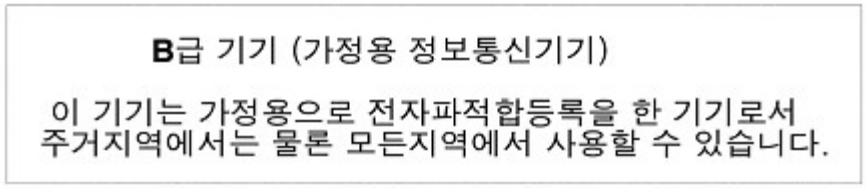
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Korean notice

Class A equipment



Class B equipment



Laser compliance

This product may be provided with an optical storage device (that is, CD or DVD drive) and/or fiber optic transceiver. Each of these devices contains a laser that is classified as a Class 1 Laser Product in accordance with US FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

Each laser product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated May 27, 2001; and with IEC 60825-1:1993/A2:2001.

⚠ **WARNING: Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:**

- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Battery replacement notice

⚠ **WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:**

- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Power cord statement for Japan

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Electrostatic discharge

In this section

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Specifications

In this section

Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 60°C (-40°F to 140°F)
Storage	-20°C to 60°C (-4 to 140°C)
Maximum wet bulb temperature	30°C (86°F)
Relative humidity (noncondensing)**	
Operating	10% to 90%
Shipping	10% to 90%
Storage	10% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.
** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

Server specifications

Specification	Value
Height	4.29 cm (1.69 in)
Depth	71.1 cm (28.00 in)
Width	26.14 cm (10.29 in)
Weight (maximum)	9.43 kg (20.8 lb)

Technical support

In this section

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, see the HP US service locator webpage (http://www.hp.com/service_locator).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage (http://welcome.hp.com/country/us/en/contact_us.html). To contact HP by phone:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.
- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (http://www.hp.com/support).

Acronyms and abbreviations

ABEND

abnormal end

ASR

Automatic Server Recovery

BIOS

Basic Input/Output System

DDR

double data rate

DHCP

Dynamic Host Configuration Protocol

ESD

electrostatic discharge

FC

Fibre Channel

FCA

Fibre Channel adapter

I/O

input/output

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

IP

Internet Protocol

ISEE

Instant Support Enterprise Edition

KVM

keyboard, video, and mouse

LED

light-emitting diode

NBP

Network Bootstrap Program

NFS

network file system

NIC

network interface controller

ORCA

Option ROM Configuration for Arrays

OSEM

Open Services Event Manager

POST

Power-On Self Test

PSP

ProLiant Support Pack

PXE

Preboot Execution Environment

RAID

redundant array of inexpensive (or independent) disks

RBSU

ROM-Based Setup Utility

RDP

Remote Desktop Protocol

RILOE

Remote Insight Lights-Out Edition

ROM

read-only memory

SAN

storage area network

SFP

small form-factor pluggable

SIM

Systems Insight Manager

SNMP

Simple Network Management Protocol

TCP/IP

Transmission Control Protocol/Internet Protocol

TFTP

Trivial File Transfer Protocol

UID

unit identification

VCA

Version Control Agent

WEBES

Web-Based Enterprise Service

WfM

Wired for Management

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